USC Viterbi

School of Engineering

Thomas Lord Department of Computer Science

CSCI 299 (113x): Programming Fundamentals for Computational Science

Units: 4.0
Fall 2024

Days:	TuTh
Times:	4:00-5:50PM
Location:	SLH 102
Instructor:	TBD
Office:	Listed on Brightspace and Piazza
Office Hours:	Listed on Brightspace and Piazza
Contact Info:	Listed on Brightspace and Piazza

Teaching Assistants/Tutors:	Listed on Piazza
Office Hours:	Listed on Piazza
Contact Info:	Use Piazza

Catalogue Description
Introduction to Python and C++; intended for students without prior programming experience; examples from various domains in computational science

Course Description
This course is intended to teach the fundamentals of programming using Python and a brief introduction to C++. Python's high-level data structures and clear syntax make it an ideal first language, while many existing libraries make it suitable to tackle almost any programming task. Python offers an interactive environment in which to explore procedural, functional, and object-oriented approaches to problem-solving. This course is designed for non-engineering students who need foundational programming skills. The examples and assignments used in this course will specifically highlight data and algorithms needed to solve computational problems in various fields.

Learning Objectives
By the end of this course, students will be able to:

- Write programs that get input from the user and display information to the user.
- Write programs using conditional and iterative structures, and functional decomposition.
- Demonstrate an understanding of various variable types including integers, floats, strings, and Booleans.
- Define and call functions to simplify solutions and promote the concept of code reuse.
- Create programs that utilize both terminal and file I/O methods to perform data analysis.
- Use sequence and associative data structures including lists and dictionaries.
- Develop simple algorithms to solve computational problems in various domains.
- Demonstrate an understanding of computational complexity and how it impacts the way a program runs.
- Apply object-oriented principles to implement basic object types.
- Select and use libraries appropriate for various programming tasks, with an emphasis on computational science.

Prerequisite(s): None. This course is intended for (but not limited to) students whose major or other interests require computer programming for computational or quantitative inquiry.

Course Notes
This course will make use of **Brightspace** (https://brightspace.usc.edu/) for content, labs, and assignments. Lecture slides and any supplemental course content will be posted to Brightspace for use by all students. All assignments and labs will be posted to Brightspace and will be submitted through Brightspace.

This course will also use **Piazza** (https://piazza.com/) for answering questions and posting information. The course on Piazza is used for all current sections of this course, not just your section. This is the preferred way to communicate with instructors, teaching assistants, and tutors. When posting, make sure to include your name, section, and instructor.

Technological Proficiency and Hardware/Software Required
Students will need a computer (laptop or desktop) and access to the internet. If you do not have access to a computer, please see below. The software needed for this course is available for free online. All homework and projects will need this software to be completed (available for Mac and Windows). Download the latest version of **Python 3** at https://www.python.org/downloads/.

You will also need to download and install PyCharm, which is an integrated design environment (IDE) for creating a project and writing code. Download the latest version of **PyCharm CE (Community Edition)** at https://www.jetbrains.com/pycharm/download/.

USC Computing Center Laptop Loaner Program
Information Technology Services provides loaner laptops at the general-use computing center in the Ahmanson Information Commons at Leavey Library. Computing accessories may also to be checked out by faculty, staff, and

students at the USC Computing Centers. Information about this program can be found at https://itservices.usc.edu/spaces/laptoploaner/.

Required Readings:
None. Videos and slides are posted on Brightspace.

Optional Readings and Supplementary Materials:
Downey, A. B., (2015). *Think Python: How to Think Like a Computer Scientist*. https://greenteapress.com/wp/think-python-2e/

Swaroop, C. H., *A Byte of Python*. https://python.swaroopch.com/

Description and Assessment of Assignments
There are approximately 10 coding assignments that will be due on Mondays at 11:59 pm PT (Pacific Time). Each assignment covers the material from the current module and past ones since concepts build upon each other. Once a concept has been covered, you will have at least a week before the assignment is due that covers that concept. The assignments will be posted on Brightspace under the Weekly Modules. Each assignment will include instructions, a grading rubric, and a link for electronic submission. Assignments must be submitted using this link. You must code the solutions according to the content taught in this course. Using coding techniques and modules outside the content of this course is not allowed and will receive 0 points. Each assignment must be completed individually. Do not collaborate with other students for these assignments. If you need help, please ask for help by posting on Piazza and attending office hours and/or open lab hours. Each assignment covers important concepts, and all assignments need to be completed to be successful in this course.

Assignment Late Policy
It is the student's responsibility to submit assignments on or before the due date. Assignments submitted after the due date will receive a 10% late penalty for each day. For example, assignments submitted within 24 hours (1 day) late will have 10% of the total points deducted from the graded score, and assignments submitted over one day and up to two days (> 24 hours and <= 48 hours) late will have 20% of the total points deducted from the graded score. After seven days, submissions will not be accepted, and the score for the assignment will be a 0.

You may ask for an assignment's late policy to be waived for various reasons. This needs to be approved before the due date of the assignment. To ask for a waiver, please contact the instructor using Piazza or email. Do not contact LAs for this since they are not authorized to approve these requests.

Assignment Grading Timeline
Assignments will be graded within two weeks. Students have one week to contest a grade once it has been posted on Brightspace. After this one week, the grade will not be changed. To contest a grade, create a new post on Piazza to Instructors and select the grades folder. In the post, include your name, your instructor, your section, the assignment, and your reasons. This will allow the grader, instructor, and head tutor to view your submission and make a decision. Do not email the grader directly. All communication regarding grading issues needs to be seen and approved by the instructor.

In-Class Labs
There will be approximately ten in-class labs. They should be done the day they are assigned; however, the labs are due on Fridays at 11:59 pm PT (Pacific Time). Labs must be submitted on Brightspace. The two lowest scores will be dropped. There is no late policy for labs since late labs will not be accepted.

Exams
There are two exams for this course. Make-up tests will not be offered, except for documented medical or family emergencies. If you will not be able to attend a test due to an athletic game or other valid reason, then you must coordinate with the instructor before the test is given. You may arrange to take the test before you leave, with

approved university personnel during the time you are gone, or within the week the test is given. If you do not take a test, then you will receive a 0 for the test.

If you need accommodations, register with OSAS (Office of Student Accessibility Services). Once you receive your accommodation letter, share your letter with the instructor at least one week before the test. You may give it to them in person, send an email, or post it on Piazza. This will allow time for arrangements to be made.

Final Project

The final project replaces the final exam. This comprehensive assignment will be due during Finals Week and needs to be submitted by the due date. Late projects will not be accepted. If you do not submit a final project or if you submit it past the deadline without instructor approval, then you will receive a 0 for the final project.

Assignments and Labs (Domain-specific applications)

In-class Labs	Programming Concept
Lab 1	Python: Math Operators
Lab 2	Python: Branching & Boolean Expressions
Lab 3	Python: Loops
Lab 4	Python: Sequences
Lab 5	Python: Functions
Lab 6	Python: Files
Lab 7	Python: Dictionaries
Lab 8	Python: Objects
Lab 9	C++: Fundamentals
Lab 10	C++: Data Structures

Assignments	Programming Concept	Domain Application Example
Assignment 1	Python: Variables and User Output	Assignments 1 - 4 will introduce fundamental programming concepts using math and science examples.
Assignment 2	Python: Equation Solvers	
Assignment 3	Python: Numbers (odd, even, factors)	
Assignment 4	Python: Sum and Product	
Assignment 5	Python: Sequences	Assignments 5 - 10 will use publicly available data sets to explore the use of Python in computational science disciplines. Examples include applications to astronomy, quantitative and computational biology, chemistry, cognitive science, economics, neuroscience, physics, political science, and psychology.
Assignment 6	Python: Functions	
Assignment 7	Python: Datasets	
Assignment 8	Python: Dictionaries	
Assignment 9	Python: Objects	
Assignment 10	Python: Visualization	

Grading Breakdown

Category	% of Grade
Coding Assignments (weighted proportionally)	50
In-Class Labs & Polls	15

Exams (2, 10% each)	20
Final Project	15
TOTAL	100

Grading Scale
Course final grades will be determined using the following scale:

Letter grade	Corresponding numerical point range
A	>= 93
A-	>= 90 and < 93
B+	>= 87 and < 90
B	>= 83 and < 87
B-	>= 80 and < 83
C+	>= 77 and < 80
C	>= 73 and < 77
C-	>= 70 and < 73
D+	>= 67 and < 70
D	>= 65 and < 67
F	< 65

For the Pass/No Pass grading option, you must earn at least 70% to pass.

Adding the Course after Week 1
Per university policy, students are allowed to add the course until the end of week 3. Any students wishing to add the course should plan on attending the course from the beginning of the semester. Upon adding the course after week 1, the student should email the instructor immediately to make a plan for the completion of work and learning missed materials. Any missed work is required to be completed and submitted according to the schedule provided by the instructor. If you register for the class after assignments/labs are due, then you will have one week from when you registered for the class to submit the assignments. If you add the class during the third week of classes, then you must meet with the instructor to create a plan together on how to catch up to the rest of the class. By the beginning of week 4, two labs and two assignments are due.

Attendance
Attendance is not part of the grading breakdown, although attending classes will help you learn the material and succeed in this course. If you are not able to attend synchronously, then it is your responsibility to watch the recorded lectures and complete the in-class labs.

Communication
The only way to communicate with instructors, teaching assistants and tutors is by posting on Piazza (http://piazza.com). All students, instructors, teaching assistants, and tutors will have access to the same course on Piazza. Information about accessing Piazza is available on Brightspaces. If you have questions about assignments, exams, and other aspects of this course, please post on Piazza. You are able to make public posts that all members can see and answer or private posts to individuals which are only accessible to course staff. To make a private post to all course staff: next to “Post to” select the “Individual Students(s) / Instructor(s)” option and enter “Instructors” in the text field. If you post more than one line of code, you must create a private post to Instructors.

Students should NOT directly email the course staff: all correspondence with the course staff must be done on Piazza.

Students and Disability Accommodations
USC welcomes students with disabilities into all of the University’s educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who

encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

If you have course accommodations authorized by OSAS (Office of Student Accessibility Services), please email the instructor or post privately on Piazza and attach your accommodation letter by the end of Week 3. In the body of the message, include your name and your class section. In addition, reach out the week before the test to discuss details for coordinating specific test accommodations.

Academic Integrity
This course will follow the expectations for academic integrity as stated in the USC Student Handbook. All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Assignments and projects in computer programming courses are *different* from those in some other types of courses. Students may NOT collaborate, work together, share code, or in any way exchange solutions for assignments and projects. Assignments may be analyzed by software that looks for similarities. Any sharing of ideas or code will be considered a violation of academic integrity (cheating). Do not share your code with anyone else in this or any future section of the course, as allowing someone else to copy your code carries the same penalty as you copying the code yourself. Do not submit another person's work as your own. Do not collaborate during online tests. Do not cheat!

Past students who have been found to have violated academic integrity standards have each received a 0 on the assignments and projects. Many times this has led to an F in the course.

Use of Artificial Intelligence (AI) Tools like ChatGPT
Since creating, analytical, and critical thinking skills are part of the learning outcomes of this course, all assignments should be prepared by the student working individually. Students may NOT have another person or entity complete any substantive portion of the assignment. Developing strong competencies in these areas will prepare you for a competitive workplace. Therefore, using AI-generated tools is prohibited in this course, will be identified as plagiarism, and will be reported to the Office of Academic Integrity.

Course Content Distribution and Synchronous Session Recordings Policies
USC has policies that prohibit the recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class is not allowed unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. (Living our Unifying Values: The USC Student Handbook, page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study is not allowed. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relation to the class, whether obtained in class, via email, on the internet, or via any other media. (Living our Unifying Values: The USC Student Handbook, page 13).

Course Schedule: A Weekly Breakdown

	Topics	In-Class Lab	Lab Due Date*	Assignment	Assignment Due Date^
Week 1	User Output and Variables	Installation		Assignment 1	09/09/2024
Week 2	Math Operators and User Input	Lab 1	09/06/2024	Assignment 2	09/16/2024
Week 3	Branching and Boolean Expressions	Lab 2	09/13/2024	Assignment 3	09/23/2024
Week 4	While Loops and For Loops	Lab 3	09/20/2024	Assignment 4	09/30/2024
Week 5	Modules and Sequences	Lab 4	09/27/2024	Assignment 5	10/07/2024
Week 6	Lists	No Lab		Study for Exam	
Week 7	Exam #1 Functions	Exam #1		No Assignment	
Week 8	Functions and Files	Lab 5	10/18/2024	Assignment 6	10/28/2024
Week 9	File Parsing	Lab 6	10/25/2024	Assignment 7	11/04/2024
Week 10	Dictionaries and JSON	Lab 7	11/01/2024	Assignment 8	11/11/2024
Week 11	Objects	Lab 8	11/08/2024	Assignment 9	11/18/2024
Week 12	NumPy, SciPy, and Pandas	No Lab		Study for Exam	
Week 13	Visualizations Exam #2	Exam #2		Assignment 10	12/02/2024
Week 14	C++ Fundamentals	Lab 9	11/29/2024	Work on Final Project	
Week 15	C++ Data Structures	Lab 10	12/06/2024	Work on Final Project	
FINALS		Final Project		Refer to the final exam schedule in the USC *Schedule of Classes* at classes.usc.edu.	

* Each in-class lab is due on Friday by 11:59 pm PT (Pacific Time).
^ Each assignment is due on Monday by 11:59 pm PT (Pacific Time).
*^ Dates are in MM/DD/YYYY format.

Statement on Academic Conduct and Support Systems

Academic Integrity:
The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, comprises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity, see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Support Systems:
Counseling and Mental Health - *(213) 740-9355 – 24/7 on call*
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

988 Suicide and Crisis Lifeline - *988 for both calls and text messages – 24/7 on call*
The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

Relationship and Sexual Violence Prevention Services (RSVP) - *(213) 740-9355(WELL) – 24/7 on call*
Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - *(213) 740-5086*
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - *(213) 740-5086 or (213) 821-8298*
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - *(213) 740-0776*
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - *(213) 740-0411*
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - *(213) 740-2101*
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - *UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - *UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call*
Non-emergency assistance or information.

Office of the Ombuds - *(213) 821-9556 (UPC) / (323-442-0382 (HSC)*
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - *(323) 442-2850 or* otfp@med.usc.edu
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.