Course Syllabus

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Instructor

John K. Ostlund

jostlund@andrew.cmu.edu (mailto:jostlund@andrew.cmu.edu) (or jkostlund@gmail.com)

Hours of availability: 10:00 am to 9:00 pm, 7 days per week, via email and Zoom

I will be available to you as much as I can, 7 days per week, unless I'm traveling.

Office Hours: Via Zoom, every Sunday from 2:00 to 4:00 pm

Lectures: Tuesday and Thursday, 3:30 to 4:50 pm, Hamburg Hall 1002

Final Exam: In class on Thursday, Feb. 29, from 3:30 to 4:50 pm

Teaching Assistant

Jingwei Dai   **jingweid@andrew.cmu.edu (mailto:jingweid@andrew.cmu.edu)**

- The primary job of the TAs will be to help me with grading homework assignments, and to answer questions from you about the course material and the homework
- They may also hold office hours via Zoom, if they choose to

Course Information	Course Title: **Python Programming I** Instructor: John K. Ostlund (**jostlund@andrew.cmu.edu (mailto:jostlund@andrew.cmu.edu)**)
Prerequisites (if applicable)	None
Description*	This course focuses on the fundamentals of computer programming using the Python 3 interpreted programming language. This course is designed for students with little or no programming knowledge.

Students will develop their problem solving skills using the top-down procedural programming approach to build standalone software applications. Assignments will include weekly homework, bi-weekly checkpoint quizzes, and a final examination to test essential programming and problem solving skills. Some OOP (object oriented programming) will be used in this course. Learners will study how to build professional, user-friendly computer programs applicable to real-world usage in such areas as public policy and security analysis.

Course Materials (if applicable)	**Software** Anaconda Version 2023.09 including Python 3.11, for Windows, Mac, or Linux: **https://www.anaconda.com/download** ⤷ **(https://www.anaconda.com/download/)** See this installation video for guidance: **https://www.youtube.com/watch?v=3J_Spo4amqY** ⤷ **(https://www.youtube.com/watch?v=3J_Spo4amqY)** ▷ **(https://www.youtube.com/watch?v=3J_Spo4amqY)** **Online Python Documentation and Tutorial** docs.python.org/3.11/ docs.python.org/3.11/tutorial **Recommended Textbook (expensive, not required, but very good!)** **Starting Out with Python, 5th Edition**, 2021, Tony Gaddis ISBN-13: 9780136679110 **Optional Books** **Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Jupyter, 3rd Edition**, by Wes McKinney ISBN-13: 978-1098104030 (available for free online through the Carnegie Mellon University Library:

https://learning.oreilly.com/library/view/python-for-data/9781098104023/cover.html ⇨
(https://learning.oreilly.com/library/view/python-for-data/9781098104023/cover.html)

Sign in using your Andrew email address and password.)

Automate the Boring Stuff with Python: Practical Programming for Total Beginners (Sweigart, Al) ISBN-13: 978-1593275990, ISBN-10: 1593275994 **(available for free on the web)**

Evaluation Method	The final grade will be out of 100%. The grading breakdown is as follows: • Weekly Homework 20% • Online Quizzes 35% • Final Exam 45% For each **homework assignment**, you will be assigned to a team of two or three people. To get the most from the homework, do as much of the homework yourself as possible. (As you work on the homework, if you get stuck, please feel free to ask your teammates, other students, the TAs, or the professor for help.) Then compare what you did with what your team members did (and with other students as well, if you wish). Finally, *just one* member of your team should submit a **zip** archive of homework solutions to Canvas, on behalf of all team members. To get an A on a homework assignment, your team must get a score of 90 or better out of 100 (we fully expect everyone to get an A on each homework assignment). Each week, there are also **labs** available for you to try. These are not graded, but are useful for practice. You will need to pass a **quiz** for each week's material. These quizzes are on Canvas, and require LockDown Browser and Respondus Monitor. To get an A on a quiz, you must score 87.5% or better of the available points. You will have up to *4 chances* to get an A on each quiz. Questions are generated from a large question base, so it is unlikely that you will get exactly the same questions on each attempt for a given quiz. You are only permitted to take a given quiz *one time per day* (if you are unable to get an A, we expect you to do some review and study prior to your next attempt, rather than merely rolling the dice and hoping for the best). The **final exam** will be like a very long quiz. *The final exam will be in class on Thursday, Feb. 29.* You will only have *one chance* to take the final exam. The final exam is the only deliverable in the course on which it will be possible to get

an A+, if you are among the very top performers. So to get an A+ as a course grade, you must get an A+ on the final exam, and A on most if not all of the homework assignments and quizzes.

Letter grades have these Heinz standard QPA points:

A+	4.33	A	4.00	A-	3.67
B+	3.33	B	3.00	B-	2.67
C+	2.33	C	2.00	C-	1.67
D+	1.33	D	1.00	D-	0.67

Suppose your Homework and Quiz average grades are A (which is more or less expected), and that your Final Exam grade is A-. Then your course grade QPA would be:

4.00 * 0.20 + 4.00 * 0.35 + 3.67 * 0.45 == 3.8515

I round rather than truncating, so this becomes a course letter grade of A.

In order to get an A+ course letter grade, your course grade QPA must be > 4.0 (strictly greater than 4.0).

Learning/Course Objectives*	Use the Python Spyder, PyCharm, and/or IDLE integrated development environment (IDE) in interactive and script mode to both test code snippets and author professional programs. Develop problem solving skills through practice and understanding of the top-down procedural programming and Object Oriented Programming methodologies. Perform calculations, evaluate numerical relations and logical expressions, manipulate character strings, and utilize Python's decision and loop structures. Form and manipulate collections of data (such as lists, tuples, sets, and dictionaries). Produce modules of functions for code reuse. Solve real-world problems using the Python language.
Heinz College Grading Scale*	A+ 97.00 – 100.00%

	A 93.00 – 96.99%
	A- 90.00 – 92.99%
	B+ 87.00 – 89.99%
	B 83.00 – 86.99%
	B- 80.00 – 82.99%
	C+ 77.00 – 79.99%
	C 73.00 – 76.99%
	C- 70.00 – 72.99%
	*Subject to change, at the professor's discretion
Course/Topical Outline:*	• Week 1 - Python Basics 　○ Exponentiation 　○ Unary Plus and Minus 　○ Multiplication, Division, Modulus, and Floor Division 　○ Addition and Subtraction 　○ Precedence, Associativity, and **(...)** 　○ The Python Shell and IDLE Integrated Development Environment 　○ Variables, Assignment, Values, and Comments 　○ Arithmetic and Arithmetic Operators 　○ Scalar Data Types: **int**, **float**, **str**, **bool**, special value **None** 　○ String (**str**) representation and operations 　○ The **print()** output function 　○ The **list** collection type (a class) 　○ **for** loops and the **range()** function • Week 2 - Slices, **if/else** Decisions, Programs, Functions, and Input 　○ Sequences and Slices 　○ Object Identity, References, **==** vs. **is** 　○ **if/elif/else** Decisions and Indentation Rules 　○ Equality, Inequality, Relational, and Logical Operators 　○ User Input: the **input()** function 　○ Type Conversions and Exceptions 　○ The **while** Loop 　○ Writing a Program 　○ Defining and Calling Functions 　○ File Input and Output • Week 3 - Review, Modules, **tuple**, **set**, and **dict** 　○ Importing Modules

- The **tuple** Sequence
- The **set** Collection
- The **dict** Dictionary

- Week 4 - Collection Properties, Defining Modules, and Comprehensions
  - Creating Empty, One Item, Multi Item Collections
  - Mutable, Iterable, Sortable, Sliceable Collections
  - Collection Conversions and the **zip()** Function
  - Defining Well-Structured Modules
  - **list** Comprehensions
- Week 5 - More Comprehensions, Collection Conversions, String Handling
  - Letter Case
  - Justification
  - **split()** and **join()**
  - Counting, Finding, and Replacing Substrings
  - Formatting
  - Conversions among **list**, **tuple**, **set**, and **dict** types
  - More **list** Comprehensions
  - **set** and **dict** Comprehensions
  - String (**str**) Handling
- Week 6 - NumPy, Statistics, and Visualization
  - NumPy N-dimensional Arrays
  - Vectorized Mathematics
  - Statistics and Random Number Generators
  - Visualization with **matplotlib**
- Week 7 - Review and Final Exam
  - Final Exam on Thursday, Feb. 29

* Subject to change

Schedule		
Week 1:	Homework 1 due before midnight Mon., Jan. 22	
Week 2:	Pass Quiz 1 before midnight Fri., Jan. 26	
	Homework 2 due before midnight Mon., Jan. 29	
Week 3:	Pass Quiz 2 before midnight Fri., Feb. 2	
	Homework 3 due before midnight Mon., Feb. 5	
Week 4:	Pass Quiz 3 before midnight Fri., Feb. 9	
	Homework 4 due before midnight Mon., Feb. 12	

	Week 5: Pass Quiz 4 before midnight Fri., Feb. 16
	
	                   Homework 5 due before midnight Mon., Feb. 19
	
	Week 6: Pass Quiz 5 before midnight Fri., Feb. 23
	
	                   Homework 6 due before midnight Mon., Feb. 26
	
	Week 7: **Final Exam on Thursday, Feb. 29**

Course Policies & Expectations	**Assignment Submission:** **Homework Assignments will be due at 11:59 pm U.S. Eastern Daylight Time (EDT) on Monday each week.** ***Just one*** member of each homework team must post the team's **zip** archive of solution files to Canvas prior to the deadline. ***Late homework will lose points rapidly, as described in the instructions for each assignment.*** If you experience upload problems with Canvas, email me your work for grading. **Students with Disabilities:** Our community values diversity and seeks to promote meaningful access to educational opportunities for all students. CMU and your instructors are committed to your success and to supporting Section 504 of the Rehabilitation Act of 1973 as amended and the Americans with Disabilities Act (1990). This means that in general no individual who is otherwise qualified shall be excluded from participation in, be denied benefits of, or be subjected to discrimination under any program or activity, solely by reason of having a disability. If you believe that you need accommodations for a disability, please contact us ASAP, and we will work together to ensure that you have the correct access to resources on campus to assist you through your coursework and time at CMU. **Academic Integrity:** Carnegie Mellon University sets high standards for academic integrity. Those standards are supported and enforced by students, including those who serve as academic integrity hearing panel members and hearing officers. The presumptive sanction for a first offense is course failure, accompanied by the transcript

notation "Violation of the Academic Integrity Policy." The standard sanction for a first offense by graduate students may be suspension or expulsion. Please see http://www.cmu.edu/academic-integrity/ for any questions.

Cell Phones, Smartphones and other handheld wireless devices:

Other than during class breaks, please silence ring tones and refrain from engaging in calls, messaging or other use during class time. All devices must not be visible during quizzes.

Policy Regarding Students Using English as a Foreign Language:

Assignments in this course are graded with reference to evidence of the acquisition of concepts, presentation format, and accuracy of information. Having done business in countries that use languages other than English, we understand that the use of an unfamiliar language can result in unusual word choices or grammatical errors that are not critical to the overall understanding of the information. Therefore, we will take into account your need to function in a language that may be unfamiliar to you. We will provide feedback as appropriate if we feel that language or grammar you have used in assignments would be best if it were configured in a different way.

Use of Canvas System for this course:

The Heinz School uses Carnegie Mellon University's Canvas system to facilitate distance learning as well as to enhance main campus courses. In this course, we will use the Canvas system generally to post lecture notes and related documents and to receive assignments electronically from students.

Take care of yourself:

Do your best to maintain a healthy lifestyle this semester by eating well, exercising, avoiding drugs and alcohol, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress.

All of us benefit from support during times of struggle. You are not alone. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is often helpful. If you or anyone you know experiences any

academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. Counseling and Psychological Services (CaPS) is here to help: call 412-268-2922 and visit their website at http://www.cmu.edu/counseling/. Consider reaching out to a friend, faculty or family member you trust for help getting connected to the support that can help.

If you or someone you know is feeling suicidal or in danger of self-harm, call someone immediately, day or night:

- CaPS: 412-268-2922
- Re:solve Crisis Network: 888-796-8226
- If the situation is life threatening, call the police:
  - On campus: CMU Police: 412-268-2323
  - Off campus: 911

If you have questions about this or your coursework, please let me know.

Course Summary:

Date	Details	Due
Sun Jan 21, 2024	🗓️ **Python Programming I - Mini 3 2024 (https://canvas.cmu.edu/calendar? event_id=561165&include_contexts=course_38298)**	2pm to 4pm
Mon Jan 22, 2024	📝 **Homework 1 (https://canvas.cmu.edu/courses/38298/assignments/682121)**	due by 11:59pm
Sat Jan 27, 2024	🚀 **Week 1 Quiz - Requires Respondus LockDown Browser + Webcam (https://canvas.cmu.edu/courses/38298/assignments/682116)**	due by 11:59pm

Date	Details	Due
Sun Jan 28, 2024	🗓️ **Python Programming I - Mini 3 2024 [(https://canvas.cmu.edu/calendar? event_id=561166&include_contexts=course_38298)](https://canvas.cmu.edu/calendar?event_id=561166&include_contexts=course_38298)**	2pm to 4pm
Mon Jan 29, 2024	📝 **Homework 2 [(https://canvas.cmu.edu/courses/38298/assignments/682122)](https://canvas.cmu.edu/courses/38298/assignments/682122)**	due by 11:59pm
Sat Feb 3, 2024	🚀 **Week 2 Quiz - Requires Respondus LockDown Browser + Webcam [(https://canvas.cmu.edu/courses/38298/assignments/682112)](https://canvas.cmu.edu/courses/38298/assignments/682112)**	due by 11:59pm
Sun Feb 4, 2024	🗓️ **Python Programming I - Mini 3 2024 [(https://canvas.cmu.edu/calendar? event_id=561167&include_contexts=course_38298)](https://canvas.cmu.edu/calendar?event_id=561167&include_contexts=course_38298)**	2pm to 4pm
Mon Feb 5, 2024	📝 **Homework 3 [(https://canvas.cmu.edu/courses/38298/assignments/682123)](https://canvas.cmu.edu/courses/38298/assignments/682123)**	due by 11:59pm
Sat Feb 10, 2024	🚀 **Week 3 Quiz - Requires Respondus LockDown Browser + Webcam [(https://canvas.cmu.edu/courses/38298/assignments/682113)](https://canvas.cmu.edu/courses/38298/assignments/682113)**	due by 11:59pm
Sun Feb 11, 2024	🗓️ **Python Programming I - Mini 3 2024 [(https://canvas.cmu.edu/calendar? event_id=561168&include_contexts=course_38298)](https://canvas.cmu.edu/calendar?event_id=561168&include_contexts=course_38298)**	2pm to 4pm
Mon Feb 12, 2024	📝 **Homework 4 [(https://canvas.cmu.edu/courses/38298/assignments/682124)](https://canvas.cmu.edu/courses/38298/assignments/682124)**	due by 11:59pm
Sun Feb 18, 2024	🗓️ **Python Programming I - Mini 3 2024 [(https://canvas.cmu.edu/calendar? event_id=561169&include_contexts=course_38298)](https://canvas.cmu.edu/calendar?event_id=561169&include_contexts=course_38298)**	2pm to 4pm
Mon Feb 19, 2024	🚀 **Week 4 Quiz - Requires Respondus LockDown Browser + Webcam [(https://canvas.cmu.edu/courses/38298/assignments/682115)](https://canvas.cmu.edu/courses/38298/assignments/682115)**	due by 11:59pm

Date	Details	Due
	📝 **[Homework 5](https://canvas.cmu.edu/courses/38298/assignments/682125)**	due by 11:59pm
Sun Feb 25, 2024	📅 **[Python Programming I - Mini 3 2024](https://canvas.cmu.edu/calendar?event_id=561170&include_contexts=course_38298)**	2pm to 4pm
Mon Feb 26, 2024	📝 **[Homework 6](https://canvas.cmu.edu/courses/38298/assignments/682126)**	due by 11:59pm
Wed Feb 28, 2024	🚀 **[Final Exam for Python Programming I, Mini 3, 2024-Requires Respondus LockDown Browser](https://canvas.cmu.edu/courses/38298/assignments/682114)** (1 student)	due by 12:25pm
	🚀 **[Week 5 Quiz - Requires Respondus LockDown Browser + Webcam](https://canvas.cmu.edu/courses/38298/assignments/682118)**	due by 11:59pm
Thu Feb 29, 2024	🚀 **[Final Exam for Python Programming I, Mini 3, 2024-Requires Respondus LockDown Browser](https://canvas.cmu.edu/courses/38298/assignments/682114)**	due by 4:55pm
	📝 **[Course Grade](https://canvas.cmu.edu/courses/38298/assignments/682119)**	
	📝 **[Final Exam Letter Grade](https://canvas.cmu.edu/courses/38298/assignments/682120)**	
	🚀 **[LockDown Browser Test Quiz - Requires Respondus LockDown Browser + Webcam](https://canvas.cmu.edu/courses/38298/assignments/682117)**	
	📝 **[Week 1 Quiz Letter Grade](https://canvas.cmu.edu/courses/38298/assignments/682127)**	

Date	Details	Due
	📝 **[Week 2 Quiz Letter Grade](https://canvas.cmu.edu/courses/38298/assignments/682128)**	
	📝 **[Week 3 Quiz Letter Grade](https://canvas.cmu.edu/courses/38298/assignments/682129)**	
	📝 **[Week 4 Quiz Letter Grade](https://canvas.cmu.edu/courses/38298/assignments/682130)**	
	📝 **[Week 5 Quiz Letter Grade](https://canvas.cmu.edu/courses/38298/assignments/682131)**	