

<b>Course Information</b>	<p>Course Title: <b>Introduction to Programming with Python</b></p> <p>Instructor: Oscar Veliz (<a href="mailto:veliz@cmu.edu">veliz@cmu.edu</a>)</p> <p>Office Hours: MR 5:00 - 7:00 Pacific or by appointment</p> <p>I try to respond to email within 24 hours but the preferred contact method is Piazza</p> <p><b>Teaching Assistant(s)</b></p> <p>Lori Zakalik <a href="mailto:lzakalik@andrew.cmu.edu">lzakalik@andrew.cmu.edu</a></p> <p>Shaymi Adetayo <a href="mailto:oadetayo@andrew.cmu.edu">oadetayo@andrew.cmu.edu</a></p> <ul style="list-style-type: none"> <li>The primary jobs of the TAs will be to help with grading homework assignments and to answer questions from you about course material and homework</li> </ul> <p>They may also hold office hours via Zoom, TBD</p>
<b>Prerequisites (if applicable)</b>	<p>None</p>
<b>Description*</b>	<p>This course focuses on the fundamentals of computer programming using the Python interpreted programming language. This course is designed for students with little or no programming knowledge.</p> <p>Students will develop their problem solving skills using the top-down procedural programming approach to build standalone software applications. Assignments will include weekly homework &amp; quizzes, a midterm, a final project 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.</p>
<b>Course Materials (if applicable)</b>	<p><b>Software</b></p> <p><u>Option 1</u> (<i>Recommended</i>): Python 3.8 (or higher) and Visual Studio Code</p> <p><a href="https://www.python.org/downloads/">https://www.python.org/downloads/</a> (Links to an external site.)</p> <p><a href="https://code.visualstudio.com/">https://code.visualstudio.com/</a> (Links to an external site.)</p> <p>To install NumPy use the command <code>'pip install numpy'</code> without quotes in the terminal. See <a href="https://numpy.org/install/">https://numpy.org/install/</a> (Links to an external site.) for more instructions. We will not be using NumPy until the end of the course so it is not immediately necessary.</p> <p><u>Option 2</u> (<i>All-in-one</i>): Anaconda (2020.17) for Windows, Mac, or Linux includes Python 3.8:</p> <p><a href="https://www.anaconda.com/products/individual">https://www.anaconda.com/products/individual</a> (Links to an external site.)</p> <p>See this installation video for guidance:</p> <p><a href="https://www.youtube.com/watch?v=GcpcYbNblPw">https://www.youtube.com/watch?v=GcpcYbNblPw</a> (Links to an external site.)</p> <p><u>Option 3</u> (<i>No installation</i>): Repl.it <a href="https://www.repl.it/">https://www.repl.it/</a> (Links to an external site.)</p>

This option depends on the website being operational. It does have a tendency to go down from time to time. If you need something just to get started this option is fine but switch to one of the other options as soon as possible.

GitHub Desktop: <https://desktop.github.com/> (Links to an external site.)

A GitHub account is required for the course. This is where you will be turning in assignments. You may also need to install git separately <https://git-scm.com/download> (Links to an external site.).

### Online Python Documentation and Tutorial

<https://docs.python.org/3.8/> (Links to an external site.)

<https://docs.python.org/3.8/tutorial> (Links to an external site.)

### Recommended Textbook (expensive and not required)

Starting Out with Python (4th Edition) 4th Edition, Tony Gaddis ISBN-13: 978-0134444321, ISBN-10: 0134444329

### Optional Books

Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython 2nd Edition by Wes McKinney ISBN-13: 978-1491957660, (**available for free online through the Carnegie Mellon University Library**)

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:

- Participation 10%
- Weekly Homework 25%
- Quizzes 25%
- Midterm 10%
- Final Project 30%

For the final project you will be allowed to work with a team of two or three people. Homework assignments are individual. As you work on the homework, if you get stuck, please feel free to ask general questions in the Canvas discussion board (do not share your code here). For specific code questions ask your the TAs, or the professor for help. To get an A on a homework assignment, you must get a score of 90 or better out of 100 (we fully expect everyone to get an A on each homework assignment).

Quizzes are on Canvas and require LockDown Browser. The lowest quiz grade will be dropped.

The **midterm** will be a long quiz, available midway through the class.

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

	<table><tr><td><b>D+</b></td><td>1.33</td><td><b>D</b></td><td>1.00</td><td><b>D-</b></td><td>0.67</td></tr></table> <p>In order to get an A+ course letter grade, your course grade QPA must be &gt; 4.0 (strictly greater than 4.0).</p>	<b>D+</b>	1.33	<b>D</b>	1.00	<b>D-</b>	0.67
<b>D+</b>	1.33	<b>D</b>	1.00	<b>D-</b>	0.67		
<b>Learning/Course Objectives*</b>	<p>Use the Python IDLE integrated development environment in interactive and script mode to both test code snippets and author professional programs.</p> <p>Develop problem solving skills through practice and understanding of the top-down procedural programming and Object Oriented Programming methodologies.</p> <p>Perform calculations, evaluate numerical relations and logical expressions, manipulate character strings, and utilize Python's decision and loop structures.</p> <p>Form and manipulate collections of data (such as lists, tuples, sets, and dictionaries).</p> <p>Produce modules of functions for code reuse.</p> <p>Solve real-world problems using the Python language.</p>						
<b>Heinz College Grading Scale*</b>	<p>A+ 97.00 – 100.00%</p> <p>A 93.00 – 96.99%</p> <p>A- 90.00 – 92.99%</p> <p>B+ 87.00 – 89.99%</p> <p>B 83.00 – 86.99%</p> <p>B- 80.00 – 82.99%</p> <p>C+ 77.00 – 79.99%</p> <p>C 73.00 – 76.99%</p> <p>C- 70.00 – 72.99%</p> <p>*Subject to change, at the professor's discretion</p>						
<b>Course/Topical Outline:*</b>	<ul style="list-style-type: none"><li>• Week 1 - Python Basics<ul style="list-style-type: none"><li>◦ Writing a Program</li><li>◦ Exponentiation</li><li>◦ Unary Plus and Minus</li><li>◦ Multiplication, Division, Modulus, and Floor Division</li><li>◦ Addition and Subtraction</li><li>◦ Precedence, Associativity, and (...)</li><li>◦ The Python Shell and IDLE Integrated Development Environment</li><li>◦ Variables, Assignment, Values, and Comments</li><li>◦ Arithmetic and Arithmetic Operators</li><li>◦ Scalar Data Types: <b>int</b>, <b>float</b>, <b>str</b>, <b>bool</b>, special value <b>None</b></li><li>◦ String (<b>str</b>) representation and operations</li><li>◦ The <b>print()</b> output function</li></ul></li><li>• Week 2 - Control Flow <b>if/else</b>, Loops, Functions, and IO<ul style="list-style-type: none"><li>◦ User Input: the <b>input()</b> function</li><li>◦ Type Conversions and Exceptions</li><li>◦ <b>if/elif/else</b> Decisions and Indentation Rules</li><li>◦ Equality, Inequality, Relational, and Logical Operators</li><li>◦ <b>while</b> loops</li></ul></li></ul>						

	<ul style="list-style-type: none"> <li>○ <b>for</b> loops and the <b>range()</b> function</li> <li>○ Defining and Calling Functions</li> <li>○ File Input and Output</li> <li>• Week 3 - <b>tuple</b>, <b>set</b>, and <b>dict</b> <ul style="list-style-type: none"> <li>○ Object Identity, References, == vs. <b>is</b></li> <li>○ The <b>list</b> collection type (a class)</li> <li>○ Sequences and Slices</li> <li>○ The <b>tuple</b> Sequence</li> <li>○ The <b>set</b> Collection</li> <li>○ The <b>dict</b> Dictionary</li> <li>○ Importing Modules</li> </ul> </li> <li>• Week 4 - Collection Properties, Defining Modules, and Comprehensions <ul style="list-style-type: none"> <li>○ Creating Empty, One Item, Multi Item Collections</li> <li>○ Mutable, Iterable, Sortable, Sliceable Collections</li> <li>○ Collection Conversions and the <b>zip()</b> Function</li> <li>○ Defining Well-Structured Modules</li> <li>○ <b>list</b> Comprehensions</li> </ul> </li> <li>• Week 5 - More Comprehensions, Collection Conversions, String Handling <ul style="list-style-type: none"> <li>○ Letter Case</li> <li>○ Justification</li> <li>○ <b>split()</b> and <b>join()</b></li> <li>○ Counting, Finding, and Replacing Substrings</li> <li>○ Formatting</li> <li>○ Conversions among <b>list</b>, <b>tuple</b>, <b>set</b>, and <b>dict</b> types</li> <li>○ More <b>list</b> Comprehensions</li> <li>○ <b>set</b> and <b>dict</b> Comprehensions</li> <li>○ String (<b>str</b>) Handling</li> </ul> </li> <li>• Week 6 - NumPy, Statistics, and Visualization <ul style="list-style-type: none"> <li>○ NumPy N-dimensional Arrays</li> <li>○ Vectorized Mathematics</li> <li>○ Statistics and Random Number Generators</li> <li>○ Visualization with <b>matplotlib</b></li> </ul> </li> <li>• Week 7 - Review, Q&amp;A, and Final Project <ul style="list-style-type: none"> <li>○ Review session</li> <li>○ Final Project Help</li> </ul> </li> </ul> <p>* Subject to change</p>
<b>Schedule</b>	<p>Week 1: Homework 1 due Feb. 4 (before class)</p> <p>Week 2: Homework 2 due Feb. 10</p> <p>Week 3: Homework 3 due Feb. 15</p> <p>Week 4: Homework 4 due Feb. 22</p> <p>Week 5: Homework 5 due Mar. 1</p> <p>Week 6: Homework 6 due Mar. 8</p> <p>Week 7: <b>Final Project due Mar. 17</b></p>
<b>Course Policies &amp; Expectations</b>	<b>Assignment Submission:</b>

**Homework Assignments will be due at 11:59 pm U.S. Eastern time on the day before class each week.** This is so that the following class can go over solutions to the assignment. *Late homework will receive half credit because the answer has already been covered.*

All submissions are completed through GitHub. For the Final Project, only one student in a team needs to submit the assignment.

This term we will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza. If you have any problems or feedback for the developers, email [team@piazza.com](mailto:team@piazza.com).

Find our class signup link at: <https://piazza.com/cmu/spring2021/90812b3> (Links to an external site.)

### **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. Note that copying someone's code is the same as copying someone's essay. Please see <http://www.cmu.edu/academic-integrity/Links to an external site.> 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 course content and related documents, to share assignments with students, and to proctor quizzes and midterms.

**Use of Zoom for this course:**

In our class, we will be using Zoom for synchronous (same time) sessions and office hours. The links are available on Canvas. Please make sure that your Internet connection and equipment are set up to use Zoom and able to share audio and video during class meetings. See [this page](#)[Links to an external site.](#) from Computing Resources for information on the technology you are likely to need. Let me know if there is a gap in your technology set-up as soon as possible, and we can see about finding solutions.

Sharing video: In this course, being able to see one another facilitates a better learning environment and promotes more engaging discussions. Therefore, our default will be to expect students to have their cameras on during class. However, I also completely understand there may be reasons students need to have their cameras off. If you have any concerns about sharing your video, please email me as soon as possible and we can discuss possible adjustments. Note: You may use a background image in your video if you wish; just check in advance that this works with your device(s) and internet bandwidth.

**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/Links to an external site.> 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

## Diversity & Inclusion

*We must treat every individual with respect.* We are diverse in many ways, and this diversity is fundamental to building and maintaining an equitable and inclusive community. Diversity refers to the multiple ways that we identify ourselves, including but not limited to race, color, national origin, language, sex, disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. Each of these identities, along with many others not mentioned here, shape the perspectives our students, faculty, and staff bring. We, at CMU, will work to promote diversity, equity, and inclusion not only because diversity fuels excellence and innovation, but because we want to pursue justice. We acknowledge our imperfections while we also fully commit to the work, inside and outside of our classrooms, of building and sustaining a campus community that increasingly embraces these core values. Each of us is responsible for creating a safer, more inclusive environment.

Unfortunately, incidents of bias or discrimination do occur, whether intentional or unintentional. They contribute to creating an unwelcoming environment for individuals and groups at the university. Therefore, the university encourages anyone who experiences or observes unfair or hostile treatment based on identity to speak out for justice and support, within the moment of the incident or after the incident has passed. Anyone can share these experiences using the following resources:

- **Center for Student Diversity and Inclusion:** [csdi@andrew.cmu.edu](mailto:csdi@andrew.cmu.edu), (412) 268-2150
- **Report-It** ([Links to an external site.](#)) **online anonymous reporting platform:** [net](#) ([Links to an external site.](#)) **username:** *tartans* **password:** *plaid*

All reports will be documented and deliberated to determine if there should be any following actions. Regardless of incident type, the university will use all shared experiences to transform our campus climate to be more equitable and just.

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