90-819 - Intermediate Programming with Python
Fall 2021 Mini 1
Section A1: MW 8:35-9:55, HBH 2008
Section B1: TR 1:25-2:45, HBH 2008
Syllabus

Instructor

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Description: This seven-week course is the follow-on to Introduction to Programming with Python. It assumes basic knowledge of Python control constructs, functions, files, data structures, and the numpy library. The course will cover gathering data from various sources including web scraping, web API's, CSV and other structured data files, and databases; data cleansing; using the pandas library for data analysis; regular expressions and other string processing methods; classes and object-oriented programming; and building real-world software applications.

Please note: Students who have taken this course should not take Data Focused Python, except for MPP-DA students. Students who have taken Data Focused Python should not take this course.

Goals: This course has three main goals. First, it will review and reinforce basic programming concepts in Python. Second, it will introduce methods of data input, data cleansing, and data analysis using Python libraries such as pandas and database access. Third, it will give students experience in more advanced programming methods, such as object-oriented programming and regular expressions.

Prerequisites: 90-812 Introduction to Programming with Python

Prerequisite Knowledge: Basic programming concepts in Python, including variables, operators, decision statements, looping statements, functions, files, built-in data structures, and common Python libraries.

Course Relevance: Programming in Python is essential for data analysis.

Course Materials:
Software

Anaconda, Python Version 3.7 (or higher), for Windows, Mac, or Linux, available at:
https://www.anaconda.com/download/
Prefer Spyder 5, but Idle and Jupyter Notebooks are fine, too

Online Python Documentation and Tutorial
docs.python.org/3.9
docs.python.org/3.9/tutorial

Recommended Textbook (available online for free through the CMU library):
Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython 2nd Edition by Wes McKinney, ISBN-13 979-1491957660, ISBN-10 - 1491957662

Evaluation Method: The final grade will be out of 100%. The grading weighting is:

Weekly Homework	30%
In-Class Quizzes	15%
In-Class Labs	15%
Final Project	40%

(**Note**: Canvas total grade is not accurate. You should compute your own grade.)

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%

Learning Objectives: At the end of this course, each student will be able to:
- write Python applications for data-analysis problems
- understand the concepts and use the constructs of Python libraries, including numpy, pandas, and the re (regular expression) package.
- load, cleanse, and process data
- use Web API's and/or web scraping to download data
- create, load, and process data in a relational database
- write object-oriented programs

Course/Topical Outline (subject to change as needed):
Week 1: Review of programming concepts
Week 2: files, numpy, pandas intro
Week 3: pandas 2, data cleaning

Week 4: API's, screen scraping, database
Week 5: regular expressions; matplotlib, plotly
Week 6: Object-oriented programming
Week 7: Project presentations (finals week)

Course Policies & Exceptions
Assignment Submission:

Everything must be submitted in Canvas by the due date/time.

If you experience upload problems with Canvas, email me your work for grading IMMEDIATELY, AND PRIOR TO, THE DUE DATE/TIME, along with a screenshot of the upload error. When emailing me your work, I also need you to email technical information to validate the issue (type out what the error message is that you are receiving, computer information, network information, file information, date/time of attempted upload, and screenshot of error) prior to the due date/time via email to me or you will receive a 0% on the corresponding assignment. I need the error information so I can validate your excuse with Canvas administration – it must be validated by error logging. If you contact me about Canvas submission issues after the due/date time, I cannot help you.

Late Policy:

Unless otherwise stated, no assignments will be accepted late. On the rare occasion that an assignment is announced that it can be submitted late, the assignment will be accepted with a penalty of 10% of the total worth of the assignment per day late, up to and including the late deadline announced. Do *not* ask me to make special exceptions for you and you alone – that is NOT fair to the rest of the class. NO assignments may ever be delivered by email. Please do not ask to have a Canvas assignment re-opened online for late submission. Budget for upload time to Canvas. All assignments are due by the start time of the class which it is due (unless otherwise noted).

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:

Collaboration is not permitted on Homework but is permitted in Labs.
Cheating will be treated very seriously.

The following are OK:

Discussing the requirements of the homework as long as no code is discussed
Discussing general approaches to solving the homework as long as no code is discussed
The following are considered cheating on the homework:

Discussing code
Showing anyone your code
Looking at anyone else's code
Having anyone else produce code for you
Having anyone else correct your code for you
Any code copied from another source must be clearly cited. Provide as a comment in the code the exact URL where the code was copied from. Code that is provided by the instructors is allowed as long as the code is clearly cited as being provided by the instructors. Of course, if you have violated the spirit of the project, you will earn zero points. Copying code without citing it is cheating.

A student who shares code with another student will be treated the same as the person who does the copying. Keep your own code safe.

The penalty for each instance of cheating, whether on a quiz, exam, or homework project, will be a zero for that assignment and a lowering of the final grade by one letter (e.g. from B to C). More egregious cheating may result in failing the class.

In addition to any penalties imposed by the instructor, all cheating and plagiarism infractions will be reported in writing to the Associate Dean for the program, the Associate Dean of Faculty, the Dean of Student Affairs, and the Dean. They will review and determine if expulsion should be recommended. The report will become part of the student’s record.

The appropriate people to refer to for help in homework projects are the TAs and the instructor. They can look at your code and help you with it. See them during office hours.

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.

A Diverse, Equitable, and Inclusive Course Community

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 campus community. Diversity can refer to 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 diverse identities, along with many others not mentioned here, shape the perspectives our students, faculty, and staff bring to our campus. 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 on the basis of 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, (412) 268-2150

Report-It online anonymous reporting platform:
www.reportit.net 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.

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.