COSI 10a3DL
Intro to Problem Solving with Python

Contact Details
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Meeting Times

Classes:
This is an asynchronous class. You will form into 5 person teams in the first week and you will meet for 30 minutes once a week with your team and a TA or myself. I will also be available to meet one-on-one for office hours as needs arise. There is no fixed class-time.

Zoom link:
https://brandeis.zoom.us/j/99497942382?pwd=WktxTTlBR25uc0QzUEphK3Q1RmIyZz09

Office Hours
Monday 1:30-3:00 on Zoom

Course Description

Skills and knowledge
By the end of this course, students will be able to:
1. create Python programs using the fundamental data structures and control structures to solve real-life problems such as data analysis
2. analyze Python programs and accurately predict what they will do without running them
3. quickly and accurately discover and explain mistakes (i.e. bugs) in Python programs
4. create online Jupyter notebooks which combine text and code so others can have access to your code and make their own modifications
5. collaborate effectively using the Scrum methodology and the Git/Github software

Teaching/learning strategies
We will organize the class into teams of 5 students. You will work with your team to produce a final project, and you will work together in weekly group sessions with a TA and/or instructor to apply the concepts introduced that week.
You will learn these skills and concepts in this course by
• watching video tutorials (live or recorded)
• practicing the skills individually and with your team
• assessing your progress with practical quizzes and creative projects
• creating a team final project using all of the skills and concepts in the course, and more

Class preparation time
A TA or I will meet with each team for 30 minutes each week and I expect that you will meet with your team for at least 2.5 hours a week. You will also need to spend an average of 8 hours a week on other classwork for this course.

Prerequisites
This class has no prerequisites, but you will need to have a computer that can download software.

Course Requirements

Academic Integrity
Every member of the University community is expected to maintain the highest standards of academic integrity. A student shall not submit work that is falsified or is not the result of the student’s own effort. Infringement of academic honesty by a student subjects the student to serious penalties, which may include failure on the assignment, failure in the course, suspension from the University or other sanctions (see section 20 of R&R). Please consult Brandeis University Rights and Responsibilities for all policies and procedures related to academic integrity. Students may be required to submit work to TurnItIn.com software to verify originality. A student who is in doubt regarding standards of academic honesty as they apply to a specific course or assignment should consult the faculty member responsible for that course or assignment before submitting the work. Allegations of alleged academic dishonesty will be forwarded to the Department of Student Rights and Community Standards. Citation and research assistance can be found at Brandeis Library Guides - Citing Sources (https://guides.library.brandeis.edu/c.php?g=301723).

Assignments
There will be three major individual creative assignments assessing mastery of skills in modeling, animation, and interactive VR design. There will also be several team assignments culminating in a team final project which will demonstrate your mastery of the skills and concepts introduced in this course.

Exams/Quizzes
There will be three quizzes which will be cumulative, meaning each quiz requires mastery of all material learned up to that point. The quizzes will be graded with Progressive Grading, so each Quiz grade replaces all of the earlier, lower Quiz grades.

**Participation**

You must participate in each team meeting. We will use several software systems which allow me to ask you questions, which you answer and then review the answers of others in the class. There are also some homework problems which will be graded on participation only, e.g. reviewing other students projects.

**Portfolio**

The projects you create in this class can become part of your academic portfolio, in case you are looking for a job or internship in the future which requires some knowledge of Python coding, Data Science, or web app development.

**Accommodations**

Brandeis seeks to welcome and include all students. If you are a student who needs accommodations as outlined in an accommodations letter, I want to support you. In order to provide test accommodations, I need the letter more than 48 hours in advance. I want to provide your accommodations, but cannot do so retroactively. If you have questions about documenting a disability or requesting accommodations, please contact Student Accessibility Support (SAS https://www.brandeis.edu/accessibility/) at 781.736.3470 or access@brandeis.edu.

**Course Materials**

If you are having difficulty purchasing course materials, please make an appointment with your Student Financial Services or Academic Services advisor to discuss possible funding options and/or textbook alternatives. All of the materials in this course, including the software are freely available.

**Required Readings / Optional Readings**

You will be required to read some manuals and to watch some videos and comment on them. We will be following the LinkedIn Learning course on Python Essential Training https://www.linkedin.com/learning/python-essential-training-2

**Apps or Tools/Equipment**

Everyone will need to have a computer with a Chrome Web Browser installed. All of the Python coding software will run in your browser and is free of charge.

LATTE
LATTÉ is the Brandeis learning management system: http://latte.brandeis.edu. Login using your UNET ID and password.

Library
The Brandeis Library collections and staff offer resources and services to support Brandeis students, faculty and staff. These include workshops, consultations, collaboration, materials and instruction on emerging trends in technologies such as machine learning, emerging trends in research such as data visualization, and emerging trends in scholarship such as open access. Librarians at the Circulation Desk, Research Help Desk, Archives & Special Collections, Sound & Image Media Studios, MakerLab, AutomationLab, and Digital Scholarship Lab are available to help you. https://www.brandeis.edu/library/about/index.html

Privacy
This class requires the use of tools that may disclose your coursework and identity to parties outside the class. To protect your privacy, you may choose to use a pseudonym/alias rather than your name in submitting such work. You must share the pseudonym/alias with me and any teaching assistants as needed. Alternatively, with prior consultation, you may submit such work directly to me.

Student Support
Brandeis University is committed to supporting all our students so they can thrive. The following resources are available to help with the many academic and non-academic factors that contribute to student success (finances, health, food supply, housing, mental health counseling, academic advising, physical and social activities, etc.). Please explore the many links on this Support at Brandeis page (https://www.brandeis.edu/support/undergraduate-students/browse.html) to find out more about the resources that Brandeis provides to help you and your classmates to achieve success.

Course Plan
The course will consist of 3 Units:

Week 1: Overview and Team Formation

Unit 1: Core Imperative Programming
In this unit we learn the core principles of almost all programming languages: variables, assignment, expressions, loops, conditionals, functions

Week 2: Overview of fundamental programming concepts in Python (Chapter 2)
Week 3: Values, Operators, and Conditional Execution
Week 4: Loops, and Lists
Week 5: Functions and tracing Python programs
Week 6: Structured Data I
Week 6: Structured Data II

Unit 2: Using and Creating Modules and APIs
In this unit, we learn how to find and use Python packages and web-based APIs. These packages and APIs give us access to high quality software and live data that has been developed by tens of thousands of talented software engineers and data scientists and is mostly free!

Week 8: Files, APIs and Data Analysis
Week 9: Visualization
Week 10: Machine Learning

Unit 3: Object Oriented Programming
In this unit, we learn how to create our own Python classes and objects, and cover the fundamental concepts in Object-oriented design including objects, classes, constructors, methods, encapsulation, information hiding, namespaces, etc.

Week 11: Objects
Week 12: Classes I
Week 13: Classes II

Additional Information

Your final course grade will be calculated using the percentages shown below:

<table>
<thead>
<tr>
<th>Class Element</th>
<th>Grade Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-class participation</td>
<td>10%</td>
</tr>
<tr>
<td>Team Final Project</td>
<td>20%</td>
</tr>
<tr>
<td>Assignments</td>
<td>30%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>40%</td>
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</tbody>
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