GEOG 286 & 386: Python Programming

Instructor: Yanan Wu (**YanaWu@clarku.edu**)
Office Location: Jeff 220
Office Hours: Tuesday & Thursday: 1:30 – 2:30 PM

Teaching Assistant: Shradha Birdika
(sbirdika@clarku.edu)
Office Location:
Office Hours: Monday & Wednesday: 3:00 – 4:00 PM

Lectures: Physics/Math, 3rd Floor, Room 310
Monday: 12:00 – 1:15 PM
Wednesday: 11:00 AM – 11:50 AM

Labs: Physics/Math, 3rd Floor, Room 310
Wednesday: 12:00 – 1:15 PM

Throughout this syllabus, bold light blue text indicates an active hyperlink.

Course Description

This course provides a general introduction to Python. Topics include elements of the programming language and basic data types. The course will also broadly introduce software development processes and workflows commonly encountered in practice.

Upon completing this course, students will understand Python programming fundamentals. No programming background is required.

Learning Objectives

Student evaluation during this course will depend on understanding and applying fundamental Python concepts in your assignments and assessments.

By the end of the course, students will:

- ✓ Become familiar with Python's programming environment
- ✓ Understand the basic concepts encountered in Python, such as:
    - Values
    - Variables
    - Expressions
    - Statements
- ✓ Have the opportunity to create basic code, including creating and manipulating:
    - Functions
    - Lists
    - Dictionaries
- ✓ Become familiar with basic geoprocessing workflows
- ✓ Be able to write programs using conditional and iterative execution

Student Responsibilities

Each student is responsible for the following:

- Completely reading the syllabus and understanding course requirements;
- Staying informed and up-to-date on all course-related work each and every week;
- Reading announcements and participating in forums;
- Posting and answering questions about the course and assignments to the course forum for the benefit of other students.

Course Format

Mondays will consist of lecture format only. This is where the instructor will introduce this week's topic, readings, and slides. All materials will be posted to Canvas before the start of class, with the exception of Week 1.

Thursday lecture will consist of partial lecture time and partial code demonstration time. This will be a great time to bring questions regarding the week's content or the assignment.

Friday's Lab session will introduce the assignment, and provide an opportunity to begin working through it together.

Technical Requirements

This course will incorporate a suite of software packages including locally downloaded **Anaconda (**Download links**)**, Visual Studio Code. In addition to setting up the appropriate software, students will need to download the course textbook (on Canvas).

Textbook (PDF)
Below is a list of recommended textbooks for learning Python and geospatial programming. They are all freely available online.

- Ujaval Gandhi (2024). *Python Foundation for Spatial Analysis*. https://courses.spatialthoughts.com/python-foundation.html
- Dave Whipp (2023). *Geo-Python 2023*. https://geo-python-site.readthedocs.io
- Qiusheng Wu (2023). *Earth Engine and Geemap: Geospatial Data Science with Python*. https://book.geemap.org

Non-open Source Textbook
　　　Eric Pimpler, Programming ArcGIS Pro with Python, 2nd Edition

Office Hours

The instructor holds student office hours twice a week on a weekly basis, and students are encouraged to regularly attend. The instructor reserves the right to assist multiple students simultaneously during scheduled in-person or virtual meetings – especially if students have similar questions.

Monday & Wednesday from 2 to 3pm (or by appointment) in the Jeff 220 (or via Zoom).

Communications Protocol

It is neither practical nor efficient to respond to technical questions via email. To ensure that questions are answered in a timely manner and to benefit all students, the following

communication protocols for the course have been established.

Technical Difficulties
Direct questions about software issues, student accounts, Canvas, and Zoom to the ITS Help Desk at (508) 793-7745.

Emailing the Instructor
For questions about grading or confidential matters, contact the instructor and schedule a time to meet via Zoom or in person. The instructor will not discuss grades or grading via email. Students must schedule a time to meet via Zoom. Use "**SSJ-Python**" as the subject of the email, and please include in the message a description of the purpose of the meeting.

The instructor responds to emails within one business day (but usually same day) and from Monday through Friday during working hours.

This means the instructor will not be available over the weekends or in the evenings. Please adhere to the suggested schedule provided in the syllabus, show up to Office Hours, and schedule any one-on-one meetings to avoid any last-second assignment issues or submissions.

Accountability
The instructor highly encourages taking measures to ensure both student and instructor are held accountable. In addition to mid- and end-of-semester instructor evaluations, students are invited to request all one-on-one meetings be held in a public or all-party, consensual audio-recorded space. Otherwise, the instructor will request that students follow up via email with a recap of any one-on-one conversations that are not confidential in nature. This recap should include a detailed summary of what was discussed, as well as bullet points covering any action items that the student, or instructor, are expected to complete with a clear deadline for each item.

Course Requirements and Policies

Class Participation

Lecture attendance is mandatory. All students are expected to attend all classes and lab sessions on time and remain in class for the duration of each class period.

Exams

The course includes one midterm exam, which must be taken on the designated day unless prior arrangements have been made. An unexcused absence on the day of the exam will result in a grade of zero.

Labs

This course has 9 lab assignments. It is each student's responsibility to make sure the corrected files are submitted before the due date. Additional files will not be accepted once the assignment has been graded. For any graded assignment, if the student does not agree with the grade received, the instructor must be notified within one week after the assignment is graded. Any request made more than one week after the grading date will not be considered, no matter whose negligence.

Grades

Breakdown of Final Grade

- 9 lab (70%):   700 points (70%)
- Midterm exam (15%):   150 points (15%)
- Final Project (15%)   150 points (15%)
                          1000 points total (100%)

A standard plus/minus letter grading scheme is used to assign final course grades for all students who take this course on a letter grading basis. Grades will be assigned according to the following scheme, with the percentages corresponding to final weighted grades following the evaluation procedures described in the section below:

Letter Grade	% of Points
A	Above 93 %
A-	(90.0 to 92.9%)
B+	(87.0 to 89.9%)
B	(83.0 to 86.9%)
B-	(80.0 to 82.9%)
C+	(77.0 to 77.9%)
C	(73.0 to 76.9%)
C-	(70.0 to 72.9%)
D+	(67.0 to 69.9%)
D	(63.0 to 66.9%)

| | D- | | (60.0 to 62.9%) |
| | F | | (0.0 to 59.9%) |

A student who enrolls in this course on a pass/no-pass grading basis will earn a passing grade only if their final course grade is equivalent to a "C" or better.

Late Policy

First Offense: No issue. We all need extra time every now and then. If students need additional time to complete an assignment—excluding the midterm and final project—students will be given three days, no questions asked.

Second Offense: Should students need extra time again—excluding the midterm and final project—students will need to provide a reason and some information corroborating your excuse. Failure to provide this info triggers the third offense protocol below.

Third (or more) Offense: For each 24-hour period that an assignment is late—including the final project—beginning immediately after the deadline passes according to the Canvas system clock, the assignment score will be adjusted downward by 20%. In other words, the assignment is considered late if submitted at 11:55:01pm and the deadline is 11:55:00 pm. Work that is more than five days late will not be graded and will receive a zero. Exceptions will be granted only under the most pressing and urgent of circumstances and must be discussed with the instructor in advance of the deadline.

Weekly Schedule

Month	Date	Day	Course Topic	Course Assignments
JAN	13	M	Course Introduction & What is Python?	
	16	R	Course Introduction & What is Python?	
	17	F	Download python and vscode	
	20	M	University holiday	
	23	R	Python Fundamental – Variables, String, Lists, Dictionaries	
	24	F	Lab 01	Lab 01 Due by Feb 2

	27	M	Python Fundamental 02 – if-else; Loops, Functions; Error handing	
	30	R	Python Fundamental 02 – if-else; Loops, Functions; Error handing	
	31	F	Lab 02	Lab 02 Due by Feb 6
FEB	3	M	Non-spatial data processing: Pandas	
	6	R	Non-spatial data processing: Pandas	
	7	F	Lab 03	Lab 03 Due by Feb 13
	10	M	Geoprocessing using Python - Working with Vector (Arcpy)	
	13	R	Geoprocessing using Python - Working with Vector (Arcpy)	
	14	F	Lab 04	Lab 04 Due by Feb 13
	17	M	Wellness Day – No classes	
	20	R	Data Visualization: Matplotlib & Seaborn & Plotly	
	21	F	Lab 05	Lab 05 Due by March 7
	24	M	Data Visualization: Matplotlib & Seaborn & Plotly	
	27	R	Data Visualization: Matplotlib & Seaborn & Plotly	
	28	F	Lab 05	
MAR	3	M	*SPRING BREAK*	
	6	R	*SPRING BREAK*	
	10	M	*Midterm*	
	13	R	*Midterm*	
	14	F	No Lab	
	17	M	Exploring and manipulating spatial data (Arcpy)	
	20	R	Exploring and manipulating spatial data (Arcpy)	
	21	F	Lab 06	Lab 06 Due by March 30
AAG	24	M	*AAG Conference*	
	27	R	*AAG Conference*	
	31	M	Geoprocessing using Python - Working with Raster Part 1 (Rasterio)	

APR	3	R	Geoprocessing using Python - Working with Raster Part 1 (Rasterio)	
	4	F	Lab 07	Lab 07 Due by Apr 13
	7	M	Geoprocessing using Python - Working with Raster Part 2 (Rasterio)	
	10	R	Geoprocessing using Python - Working with Raster Part 2 (Rasterio)	
	11	F	Lab 08	Lab 08 Due by Apr 13
	14	M	Open Source GIS (Geopandas)	
	17	R	Open Source GIS (Geopandas)	
	18	F	Lab 09	Lab 09 Due by Apr 25
	14	M	Project work	
	24	R	Project work	
	28	M	Final presentations	
MAY	1	R	Final presentations	
	5	M	**Final report due**	

*Course content may vary or be adjusted in order to meet the needs of the class. The instructor reserves the right to adjust the schedule or amend the content of this syllabus at any time and without notice.

Academic Honesty and Integrity

Students are encouraged to collaborate with one another in reviewing course material and working on assignments. However, every student must turn in an original, unique, and individual creation for every assignment; students working together may not submit the same work. Collaboration with another student on an assignment will require students cite their collaborators by providing the names of collaborators either within the assignment or alongside the link that you submit to the course website.

All students are expected to demonstrate integrity in all academic endeavors. Students are evaluated on their own merits. Cheating, plagiarism, unauthorized and/or inappropriate collaborative work, or any other form of academic dishonesty are considered unacceptable behavior and will result in a failing grade for the assignment, and a second offense will result in a failing grade for the course and a referral to university administration for disciplinary action.

Use of Large Language Models

Large language models, or generative AI like ChatGPT, are incredibly useful learning tools if used responsibly. This course will not cover their use or application to GIS in detail, but using LLMs for assignments and the final project may be tempting. As beginners in a new technical skill, LLMs may seem magical in their ability to provide answers and ideas, but they should be treated as overzealous interns from which students can test their newly acquired knowledge. Despite having access to massive datasets (e.g. the internet) to mimic speech based on user-specified prompts, they do not query these data or the internet to search for answers. They should not replace existing internet or library search protocols, and whatever LLMs produce will contain "hallucinations" or errors in accuracy. Only advanced individuals in a technical skill will notice these errors.

The instructor placed the LLM section after the "Academic Honesty and Integrity" section purposefully. If the instructor suspects LLMs have done the work for the student, similar consequences will follow if proven.

Additional Campus Resources

Students with Disabilities

Clark University is committed to providing students with documented disabilities equal access to all university programs and facilities. Students are encouraged to register with **Student Accessibility Services** (SAS) to explore and access accommodations that may support their success in their coursework. SAS is located on the second floor of the Shaich Family Alumni and Student Engagement Center (ASEC).
Please contact SAS at accessibilityservices@clarku.eduwith questions or to initiate the registration process.

FERPA

Clark's policy regarding student privacy under the **Family Education Rights and Privacy Act**

Title IX

Clark University and its faculty are committed to creating a safe and open learning environment for all students. Clark University encourages all members of the community to seek support and report incidents of sexual harassment to the Title IX office (title-ix@clarku.edu). If students or someone students know has experienced any sexual harassment, including sexual assault, dating or domestic violence, or stalking, help and support is available.

Please be aware that all Clark University faculty and teaching assistants are considered responsible employees, which means that if students tell the instructor about a situation involving the aforementioned offenses, the instructor must share that information with the Title IX Coordinator, Brittany Brickman (titleix@clarku.edu). Although, the instructor has to make that notification, the student will, for the most part, control how their case will be

handled, including whether or not they wish to pursue a formal complaint. Our goal is to make sure they are aware of the range of options available to them and have access to the resources they need.

If students wish to speak to a confidential resource who does not have this reporting responsibility, they can contact Clark's Center for Counseling and Professional Growth (508-793-7678), Clark's Health Center (508-793-7467), or confidential resource providers on campus:

GIS Help Desk

GIS HELP DESK

NEW FALL 2023 HOURS:

Need help with GIS? Can't make it to visit your professor or TA for office hours? Stop by our GIS Help Desk in the Jefferson Tower (6th floor) and visit one of our Help Desk Assistants!

MONDAYS	LARA 3 PM - 5 PM
TUESDAYS	APPLE 10 AM - 2 PM LARA 3 PM - 5 PM
WEDNESDAYS	LARA 10 AM - 2 PM
THURSDAYS	APPLE 10 AM - 12 PM
FRIDAYS	APPLE 10 AM - 12 PM

GIS Help Desk hours follow a University schedule. If the University is closed from remote/online operations for any reason, the GIS Help Desk may also be unavailable. GIS Help Desk Assistants operate on a first-come, first-serve drop-in basis. Contact Yaa Poku (ypoku@clarku.edu) with any questions, or call the Geography Main Office at 508-793-7336 for more information. The GIS Help Desk is sponsored by the Graduate School of Geography at Clark University.