GEOG 3404: GEOG INFO ANALYSIS: Python GIS

Spring 2026
Lecture Time: R: 2:40 pm- 4:00 pm
Lab Time: R: 4:10 pm- 5:20 pm
Location: Lecture & Lab: Burdick Hall 315

Instructor: Yanan Wu, PhD
Office: Burdick 318B
E-mail: ywu@uca.edu
Office Hours: MW 10:00- 11:45 am

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.

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

Course Schedule

Week	Date	Meeting	Course Topic	Course Assignments
W1	Jan 8- 9	R	Course Introduction	
W2	Jan 12 - 16	R	Software Introduction	Download Anaconda and Jupyter Notebook
W3	Jan 19- 23	R	Python Fundamental – Variables, String, Lists, Dictionaries	Lab 01:
W4	Jan 26- 30	R	Python Fundamental 02 – if-else; Loops, Functions; Error handing	Lab 02
W5	Feb 2- 6	R	Non-spatial data processing: Pandas	Lab 03
W6	Feb 9- 13	R	Data Visualization: Matplotlib & Seaborn & Plotly Part 01	Lab 04
W7	Feb 16- 20	R	Data Visualization: Matplotlib & Seaborn & Plotly Part 02	Lab 05
W8	Feb 23- 27	R	AI Tool in Python Programming	Lab 06
W9	Mar 2- 6	R	Geoprocessing using Python - Working with Raster Part 1 (Rasterio)	Lab 07
W10	Mar 9- 13	R	Geoprocessing using Python - Working with Raster Part 2 (Rasterio)	Lab 08
W11	Mar 16- 20	R	AAG Conference	No Lab
W12	Mar23- 27	R	Spring Break	No Lab
W13	Mar 30- Apr 3	R	Open Source GIS (Geopandas)	Lab 09
W14	Apr 6 - 10	R	Geoprocessing using Python - Working with Vector (Arcpy)	Lab 10
W15	Apr 13 - 17	R	Final Project Analysis	
W16	Apr 20 - 24	R	Final Presentation	
W17	Apr 27 – May 1	R	Final Report	

Grading

Grading for this course will consist of 10 labs, and one project. The details showed in Table 1 and Table 2.

It is important that all lab exercises be completed in a timely manner. Some bonus exercises may be provided. ***Labs that are not turned in by the due date can be turned in up to 2 days late with a 20% penalty.*** Labs will not be accepted after this 2-day period.

Table 1 Grade distribution

Item	Points	Description
Lab exercises	50 points each, 500 points in total	10 lab exercises. Each will be provided with guidelines.
	50 points	Project topic
	50 points	Project Outline
	50 points	Project Data
	150 points	Project Presentation, Peer-reviewed
Project	100 points	Project Report
Total	900 Points	

Table 2 Grade Scale

90%- 100%	A	> 810 points
80%- 90%	B	> 720 Points
70%- 80%	C	> 630 Points
60%- 70%	D	> 540 Points
0%- 60%	F	< 540 Points

This course requires a final project. The project is an **individual project**. *Students are responsible to determine the project topic and study area.* The project will include:

Project topic: A tentative title of the project should be submitted by the due date posted
Project outline: A tentative project outline to describe the project objectives
Project data: A tentative description of data that will be used in the project
Project presentation: Each student will give a 10-15-minute (2-3 minutes for Q&A) presentation of your project to the class
Project report: A final report with at least 5 pages without references, and with a 12 font of Times New Roman and line spacing of 1.5 lines.

Attendance Policy
1. Attendance is mandatory
2. Class will begin promptly, so please show up on time. *If you are more than 10 minutes late for an exam or final presentation, it will not be completed, and you will receive a grade of zero on the examination.*
3. *Consistent with University of Central Arkansas guidelines, excessive absences (up to 3 times) may jeopardize students' grades and the instructor reserves the right to remove you from the class permanently.*

Feedback Response Time
The instructor generally replies to emails within 48 hours, except during holidays. Often the instructor replies much more quickly, but you should not count on a same-day reply. Please plan accordingly so that you don't miss deadlines.

Classroom Etiquette
1. Switch cell phones off and place them out of view. Do not use phones during class. Resist the impulse!

2. Computers are permitted for notetaking only
3. Do not sleep in class or leave once a lecture has started
4. Do not pack up and prepare to leave until the instructor has indicated that class is over
5. No eCigarettes permitted in the classroom
6. You are encouraged to think critically and ask stimulating questions, but always respect your fellow students and your instructor

COVID-19 adaptation
According to the guidance of the University of Central Arkansas response to COVID-19, this class will be in an in-person format. The class schedule has followed this guidance. However, the schedule may be changed, and we will transfer to a virtual format if face-to-face delivery is interrupted. All students are expected to know and comply with university policies related to Covid-19. For information and resources, see https://uca.edu/coronavirus/.

Please stay healthy. If you feel any symptoms of COVID-19 (e.g., a fever of 100.4 degrees last two days, a cough, difficulty breathing, or a sore throat), please contact your healthcare provider or the Student Health Clinic (https://uca.edu/studenthealth/).

Academic Integrity Statement
The University of Central Arkansas affirms its commitment to academic integrity and expects all members of the university community to accept shared responsibility for maintaining academic integrity. Students in this course are subject to the provisions of the university's Academic Integrity Policy, approved by the Board of Trustees as Board Policy No. 709 on February 10, 2010, and published in the *Student Handbook*. Penalties for academic misconduct in this course may include a failing grade on an assignment, a failing grade in the course, or any other course-related sanction the instructor determines to be appropriate. Continued enrollment in this course affirms a student's acceptance of this university policy.

Accommodations
The University of Central Arkansas adheres to the requirements of the Americans with Disabilities Act. If you need accommodation under this Act due to a disability, please contact the Office of Accessibility Resources and Services (OARS), 450-3613.

Building Emergency Plan statement
An Emergency Procedures Summary (EPS) for the building in which this class is held will be discussed during the first week of this course. EPS documents for most buildings on campus are available at http://uca.edu/mysafety/bep/. Every student should be familiar with emergency procedures for any campus building in which he/she spends time for classes or other purposes.

Diversity Statement
The University of Central Arkansas is dedicated to attracting and supporting a diverse student, faculty, and staff population and enhancing multicultural learning opportunities. We value the opportunity to work, learn, and develop in a community that embraces the diversity of individuals and ideas, including race, ethnicity, religion, spiritual beliefs, national origin, age, gender, marital status, socioeconomic background, sexual orientation, physical ability, political affiliation, and intellectual perspective (https://uca.edu/diversity/institutional-diversity/).

Title IX disclosure

In furtherance of its core values— academic vitality, integrity, and diversity—UCA is dedicated to promoting a campus community free from discrimination. Title IX of the Education Amendments Act of 1972 requires all educational institutions to address gender-based discrimination on campus, and UCA implements these Federal requirements through a fair, consistent, and appropriate process of investigation and adjudication. Please see UCA's Title IX website (https://uca.edu/titleix/) for the university's policy, relevant forms, training opportunities, and related information.

Evaluations

Student evaluations of a course and its professor are a crucial element in helping faculty achieve excellence in the classroom and the institution in demonstrating that students are gaining knowledge. **Students may evaluate courses they are taking starting on a specific date, by logging in to myUCA and clicking on the Course Evaluations task.**