GEOG 4590 – Advanced GIS Programming
Spring 2023

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Office hours: Mon 5 – 6 pm (ENV 310B), Thu 1 – 2 pm (Zoom), or by appointment.

Prerequisite

GEOG 4560: Introduction to Python Programming (or consent of department)

Objectives

This course includes lectures, demos, hands-on exercises, homework assignments, and a programming project. It is for those who work with Esri's ArcGIS Pro on a technical level and have knowledge in programming with Python. Based on the knowledge of Python, students will learn ArcPy functions, classes, geoprocessing tools, and ArcPy mapping, data access, spatial analyst, and image analysis modules. Students will develop skills to improve GIS productivity, implement customized GIS applications, and create new GIS tools using the Python programming language. Upon successful completion of this course, students will be able to: (1) use ArcPy functions and classes; (2) programmatically manipulate the contents of existing projects and layer files; (3) query, insert and update attributes of feature classes; and (4) create geoprocessing tools and toolboxes.

Reference: Esri, ArcGIS Pro Python Reference.

Software: ArcGIS Pro 3.x and PyCharm Community Edition.

Labs, Homework, and Course Project

Labs (26%) and homework (40%) should be submitted to Canvas. Late labs and homework will be marked down 10% each day. A programming project (24%) will be distributed in class. Project files should be submitted to Canvas.

Grading Structure

Attendance	10%
Labs	26%
Four Homework Assignments (10% each)	40%
Programming Project	24%
Total	**100%**
90-100: A; 80-89: B; 70-79: C; 60-69: D; 0-59: F. A minimum grade of "B" is required for the GIS Certificate.	

Extra Credit

The Department of Geography and the Environment does not allow extra credit assignments (work not specified on a course syllabus).

Schedule

Week	Dates	Topic
2	1/23	Python Review (1) *Demos and Lab 1*
3	1/30	Python Review (2) *Demos and Lab 2.*
4	2/6	ArcPy Functions *Demos and Lab 3*
5	2/13	ArcPy Classes *Demos and Lab 4.* **Homework 1.**
6	2/20	Mapping Module (1) *Demos and Lab 5*
7	2/27	Mapping Module (2) *Demos and Lab 6.* **Homework 2.**
8	3/6	Data Access Module (1) *Demos and Lab 7*
9	3/13	**Spring Break (no class)**
10	3/20	Data Access Module (2) *Demos and Lab 8.* **Homework 3.**
11	3/27	Geoprocessing (1) *Demos and Lab 9.* **Programming Project.**
12	4/3	Geoprocessing (2) *Demos and Lab 10.*
13	4/10	Chart Module *Demos and Lab 11.* **Homework 4.**
14	4/17	Spatial Analyst Module *Demos and Lab 12.*
15	4/24	Image Analysis Module *Demos and Lab 13.*
16	5/1	Project Week (work on your project)
17	5/8	**Final Week. Programming project due 5/11.**

Academic Dishonesty

Students caught cheating or plagiarizing will receive a "0" for that particular assignment or exam. Additionally, the incident will be reported to the Office of Student Rights and Responsibilities for further penalty. According to the UNT catalog, the term "cheating" includes, but is not limited to:

a. Use of any unauthorized assistance in taking quizzes, tests, or examinations;
b. Dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
c. The acquisition, without permission, of tests or other academic material belonging to a faculty or staff member of the university;
d. Dual submission of a paper or project, or resubmission of a paper or project to a different class without express permission from the instructor(s); or
e. Any other act designed to give a student an unfair advantage.

The term "plagiarism" includes, but is not limited to:

    a. The knowing or negligent use by paraphrase or direct quotation of the published or unpublished work of another person without full and clear acknowledgment; and

    b. The knowing or negligent unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

Rules of Engagement

Rules of engagement refer to the way students are expected to interact with each other and with their instructors. Here are some general guidelines:

- While the freedom to express yourself is a fundamental human right, any communication that utilizes cruel and derogatory language on the basis of race, color, national origin, religion, sex, sexual orientation, gender identity, gender expression, age, disability, genetic information, veteran status, or any other characteristic protected under applicable federal or state law will not be tolerated.
- Treat your instructor and classmates with respect in any communication online or face-to-face, even when their opinion differs from your own.
- Ask for and use the correct name and pronouns for your instructor and classmates.
- Speak from personal experiences. Use "I" statements to share thoughts and feelings. Try not to speak on behalf of groups or other individual's experiences.
- Use your critical thinking skills to challenge other people's ideas, instead of attacking individuals.
- Avoid using all caps while communicating digitally. This may be interpreted as "YELLING!"
- Be cautious when using humor or sarcasm in emails or discussion posts as tone can be difficult to interpret digitally.
- Avoid using "text-talk" unless explicitly permitted by your instructor.
- Proofread and fact-check your sources.
- Keep in mind that online posts can be permanent, so think first before you type.

See these Engagement Guidelines (https://clear.unt.edu/online-communication-tips) for more information.

Accommodations

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the Office of Disability Accommodation website at http://www.unt.edu/oda. You may also contact them by phone at 940.565.4323.

Course Evaluation

You will receive an email with a link to the UNT Student Perceptions of Teaching (SPOT) Course Evaluation by the end of the semester.