

GEOG 4590 – Advanced GIS Programming

Spring 2020. Wednesdays 6:00 – 8:50 PM, ENV 336

Dr. Pinliang Dong
Professor, Department of Geography and the Environment
University of North Texas
Office: ENV 310B, Phone: (940) 565-2377
E-mail: Pinliang.Dong@unt.edu URL: <http://geography.unt.edu/~pdong>
Office Hours: Mondays and Wednesdays, 5:00 – 6:00 PM, 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 on a technical level and have knowledge in programming with Python. Based on the knowledge of Python, students will learn advanced labeling and field calculation with Python, ArcPy classes and functions, ArcPy mapping, data access, and spatial analysis modules, Python tools, toolboxes, add-ins, and raster processing in moving windows (neighborhoods). Students will develop skills to improve GIS productivity, implement customized GIS applications, and create new GIS tools using the Python programming language.

Reference

ArcPy Documentation:
<http://desktop.arcgis.com/en/arcmap/latest/analyze/arcpy/what-is-arcpy-.htm>

Software

ArcGIS Desktop 10.7.1 and PyCharm.

Labs and Homework

Labs and homework should be submitted to Canvas. Late labs and homework will be marked down 10% each day.

Project

A programming project (30%) will be distributed in class. Project files should be submitted to Canvas.

Extra Credit

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

Grading Structure

Class Attendance	10%
Labs	10%
Five Homework Assignments (10% each)	50%
Final Project (programming project)	30%
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.	

Schedule

Week	Date	Topic
1	Jan 15	Course Introduction and Python Review (1) <i>Demos and Lab 1</i>
2	Jan 22	Python Review (2) <i>Demos and Lab 2</i>
3	Jan 29	Advanced Labeling and Field Calculation with Python <i>Demos and Lab 3. Homework 1 (Due Feb 19)</i>
4	Feb 5	ArcPy Classes and Functions <i>Demos and Lab 4</i>
5	Feb 12	ArcPy Mapping Module (1) <i>Demos and Lab 5</i>
6	Feb 19	ArcPy Mapping Module (2) <i>Demos and Lab 6. Homework 2 (Due Mar 18)</i>
7	Feb 26	ArcPy Data Access Module (1) <i>Demos and Lab 7</i>
8	Mar 4	ArcPy Data Access Module (2) <i>Demos and Lab 8. Homework 3 (Due Mar 25)</i>
9	Mar 11	Spring Break (no class)
10	Mar 18	Spatial Analyst Module <i>Demos and Lab 9</i>
11	Mar 25	Using Tools and Toolboxes in Python <i>Demos and Lab 10. Homework 4 (Due Apr 15)</i>
12	Apr 1	Developing Python Add-ins for ArcGIS Desktop <i>Demos and Lab 11. Programming Project 1 (Due May 6)</i>
13	Apr 8	Python Add-in Classes: Buttons, Tools, and Combo Boxes <i>Demos and Lab 12</i>
14	Apr 15	Raster Processing in Moving Windows (Neighborhoods) <i>Demos and Lab 13. Homework 5 (Due May 6)</i>
15	Apr 22	Programming and Application Demonstration
16	Apr 29	Project Week (work on your project)
17	May 6	Programming Project Due

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.

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.

Classroom Courtesy

Please follow these guidelines to avoid disrupting the class:

- (1) Turn off cell phones before arriving.
- (2) Do not arrive late or leave early (except for a bathroom break or emergency).
- (3) Do not sleep or eat during class.
- (4) Do not work on other assignments during class.
- (5) Do not talk when the instructor is lecturing, unless prompted for feedback by the instructor.

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.