

# **GEOG 4590 – Advanced GIS Programming**

Spring 2019. Mondays 6:00 – 8:50 PM, ENV 336

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## **Prerequisites**

GEOG 4560: Introduction to GIS 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 and data access 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 10.6.1 and PyCharm.

## **In-Class Exercises and Homework**

In-class exercises should be saved in your folder at R:\4590\StudentFolders\. The instructor will check your in-class exercises every Tuesday. If you miss a class, you should contact the instructor and finish the exercises by the following Tuesday. Late homework will be marked down 10% each day. Homework and project files should be saved in your folder at R:\4590\StudentFolders\.

## **Project**

A programming project (30%) will be distributed in class.

## Grading Structure

Class Attendance	10%
In-Class Exercises	10%
Five Homework Assignments (10% each)	50%
Final Project (programming project)	30%
<b>Total</b>	<b>100%</b>
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 14	Course Introduction and Python Review (1) <i>Demos and In-Class Exercises</i>
2	Jan 21	MLK Day (no class)
3	Jan 28	Python Review (2) <i>Demos and In-Class Exercises</i>
4	Feb 4	Advanced Labeling and Field Calculation with Python <i>Demos and In-Class Exercises. Homework 1 (Due Feb 18)</i>
5	Feb 11	ArcPy Classes and Functions <i>Demos and In-Class Exercises</i>
6	Feb 18	ArcPy Mapping Module (1) <i>Demos and In-Class Exercises. Homework 2 (Due Mar 4)</i>
7	Feb 25	ArcPy Mapping Module (2) <i>Demos and In-Class Exercises</i>
8	Mar 4	ArcPy Data Access Module (1) <i>Demos and In-Class Exercises. Homework 3 (Due Mar 25)</i>
9	Mar 11	Spring Break (no class)
10	Mar 18	ArcPy Data Access Module (2) <i>Demos and In-Class Exercise</i>
11	Mar 25	Using Tools and Toolboxes in Python <i>Demos and In-Class Exercise. Homework 4 (Due Apr 8)</i>
12	Apr 1	Developing Python Add-ins for ArcGIS Desktop <i>Demos and In-Class Exercise. Programming Project (Due May 6)</i>
13	Apr 8	Python Add-in Classes: Buttons, Tools, and Combo Boxes <i>Demos and In-Class Exercises</i>
14	Apr 15	Raster Processing in Moving Windows (Neighborhoods) <i>Demos and In-Class Exercises. Homework 5 (Due Apr 29)</i>
15	Apr 22	Programming and Application Demos <i>Demos and In-Class Exercises</i>
16	Apr 29	Project Week (work on your project)
17	May 6	<b>Programming Project Due</b>

## Extra Credit

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

## **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.