

GIS Programming with Python

WILD 6900 Special Topics
Section 5, CRN 19532 (1 credit)
Section 6, CRN 19534 (2 credits)

Time: Wed. 1:30 – 3:10 pm, Place: BNR 208 (CNR GeoSPA)

Spring Semester, 2008

Instructors:

John Lowry, 233 JQL, 797-0653, john.lowry@usu.edu
Chris Garrard, 232 JQL, 797-2602, chris.garrard@usu.edu
Course Webpage: <http://leupold.gis.usu.edu/~jlowry/python/python.html>
Office hours: After class, or by appointment.

Course Description:

Students in this course will be introduced to basic programming principles and learn to write Python scripts that can be used to perform various GIS tasks and create GIS models. The course is divided into two sections. Students enrolled for the first 8 weeks will receive 1 credit. Students enrolled for 16 weeks will receive 2 credits.

Weeks 1-8:

Will introduce students to writing Python scripts that can be used within ESRI's ArcGIS software. We will begin by covering some basic geoprocessing concepts with ModelBuilder. The student will then learn fundamental principles of Python syntax and object-oriented programming based on the Geoprocessor Programming Model. Other topics will include learning how to use the Describe, Enumeration, Cursor, and Geometry objects in addition to reading and writing text files. At the end of this section students will be capable of writing Python scripts to facilitate GIS geoprocessing tasks that can be run from ArcGIS Toolbox.

Weeks 9-16:

Will introduce students to writing Python scripts for geoprocessing using free and Open Source libraries (not ArcGIS). The student will learn how to read, write, and perform basic analysis on vector and raster data, including map calculation operations. Other topics will include optimization (especially for handling large raster data sets) and creating custom, reusable code libraries. At the end of this section students will be capable of writing geoprocessing Python scripts using completely free software. This section uses more advanced programming concepts than the first section, but is still meant to be accessible to the non-programmer.

Class format and grading:

We will meet once a week for 2 hours. Class will usually begin with a 30-45 minute lecture and the remainder of the time will be spent doing hands-on exercises. Students will receive a letter grade based on successful completion of their weekly lab assignments. Students must attend class. Each assignment is worth 10 points and will be graded as follows: 10 points for a script that does what it's supposed to do and is adequately commented. Minus 1 point for each of the following: Insufficient comments, Each task required of the script that it does not perform. There are no exams (midterm or final). University grading scale is as follows:

A (93 - 100%)
A- (90 - 92%)
B+ (87 - 89%)
B (83 - 86%)
B- (80 - 82%)
C+ (77 - 79%)
C (73 - 76%)
C- (70 - 72%)
D (60 - 69%)
F Below 60%

Prerequisites:

Competency using ArcGIS is required (e.g. successful completion of WATS 4930 or WATS 6920). Prior programming experience is helpful but not required.

Text:

There is no required text for this course.

Academic Honesty:

The USU policy for academic honesty can be found at: <http://www.usu.edu/policies/pdf/Acad-Integrity.pdf>. Please read this document if you have questions about what academic honesty means for a USU student. Basically it means you do your own work. You may consult with other students in the class about the assignments, but what you turn in must be your own work.

Students with Disabilities:

Reasonable accommodations will be provided for all persons with disabilities in order to ensure participation within the program. If a student has a disability that will likely require some accommodation by the instructor, the student must contact the instructor and document the disability through the Disability Resource Center (797-2444) during the first week of the course.

Lesson Schedule:

Week 1 – 8: Jan. 9 – Feb 27: Geoprocessing with Python in ArcGIS

Week 9 – 16: Mar. 5 – Apr. 30: Geoprocessing with Python using Open Source GIS