

Geog 676
Special Topics in Geography: Geocomputing
Spring 2009

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Lecture: MW 9:55-10:45, 360 Science Hall
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Description: This is an intermediate-level course that will eventually be taught as *Geog 375, Introduction to Geocomputing*. This course is intended to be an introduction to scripting and programming for GIS and spatial analysis. For the purposes of the Cart/GIS major, Geog 676 (and ultimately 375) will be accepted as meeting the programming requirement. The only pre-requisite is Geog 377, which may be taken concurrently. No programming background is assumed. As permitted by time, Geog 676 will cover the following: shell scripting, use of open-source GIS libraries, programming and scripting using the Python language. This is a 3-credit offering consisting of lecture and laboratory components.

Grading: Course grades will be based on two exams (each representing 1/3rd of the total grade), and laboratory work (remaining 1/3rd of total). The exams cover material presented in lecture, with each exam representing about half of the semester. That is, the second exam is not cumulative, and is thus not a true “final” exam. The second exam is scheduled during finals week at the regular final exam period for this class: 2:45 p.m., Monday May 11. Most of the laboratory work will consist of exercises building on lecture material.

Texts: The primary text is *How to Think Like a Computer Scientist: Learning with Python*, by A.Downey, J. Elkner, and C. Meyers. Wellesly, MA: Green Tea Press, 2002, 262 pp. Available at no cost digitally from the course page on learn@uw, <http://greenteapress.com/thinkpython/>, or as printed book published by Green Tea. Some other books that may be helpful are listed below. You will also need access to a variety of material available through the internet. Prominent among these are:

- www.gdal.org
- <http://commandwindows.com>
- <http://technet.microsoft.com/en-us/library/bb491071.aspx>

Tentative Topic Outline:

I. Introduction

- Rationale and Goals for Course
- Overview of Topics

II. Basic Scripting

- Shell Commands
- Shell Scripting

III. Scripts for Geoprocessing

- Common Geospatial File Formats
- Scripting with GDAL and OGR

IV. Python Programming

- Programming and Programming Languages
- Python Fundamentals
- Functions and Control Structures
- Strings, Lists, Tuples, Dictionaries
- File I/O
- The Python os and Numpy Packages
- Objects

V. Python Wrappers for GDAL

VI. Python Scripting with Arc/GIS

- Intro to Geoprocessing Objects
- Manipulating Arc/GIS Data
- Using Arc/GIS Tools

Supplementary Books:

Beginning Python: From Novice to Professional, by M. L. Hetland. New York: Springer-Verlag, 2005, 604pp.

Non-Programmers Tutorial for Python, by J. Cogliati, 2005, 84 pp Available at no cost from the author (<http://honors.montana.edu/~jjc/easytut/easytut.pdf>) and from Wikibooks (http://en.wikibooks.org/wiki/Non-Programmer's_Tutorial_for_Python).

Core Python Programming, 2/e, by W.J. Chun, Upper Saddle River, New Jersey: Prentice Hall, 1120 pp.