URBAN STUDIES
MASTER'S IN GEOSPATIAL TECHNOLOGIES
T GIS 501
Winter 2018
Thursday 5:20-9:20p.m.

Faculty: Jim Thatcher
Office: PNK 213
Office Hours: **Tuesdays 2:00-4:00 and *by appointment***
Email: jethatch@uw.edu

COURSE DESCRIPTION

COURSE OBJECTIVES
As part of the Master's sequence, this course provides an introduction to the automation and customization of GIS processes. The course introduces the basic skills and principles necessary to read, develop, and publish scripts that interface with ArcGIS and other spatial technologies. This course provides foundational skills needed to interact with, develop, and design geospatial technologies in both the mobile and web environments.

The course follows a format of lectures and labs with an emphasis on hands-on working with spatial data in a variety of formats. The course introduces programming concepts like abstraction and flow of control predominantly through the use of the Python language. While the majority of the class focuses on using Python with ArcGIS, other tools and concepts will be introduced as well. A final project is expected of all students that brings together many of the core concepts of the course to accomplish some task through programmatic means.

COURSE OBJECTIVES
At the conclusion of the course, students will have:

- developed a working knowledge of the Python language
- be able to create scripts that automate tasks in ArcGIS
- be able to access and process data from various APIs
- be able to write clear and intelligible code in Python
- understand basic computer science and programming concepts like flow of control, data model, and abstraction
- gain experience with peer review and cooperative learning
- *be proficient in the automation and customization of geospatial information systems*

REQUIRED TEXTS
Zandbergen, Paul A. 2013. *Python Scripting for ArcGIS*. Esri Press.
Selected portions of other texts will be posted on the course electronic workspace.

TEACHING AND ASSESSMENT METHODS
The course will be based upon lectures, guest speakers, in-class exercises, labs, student presentations, and a final project. Grades will be based on preparation, participation, presentations, labs, and final projects.

CANVAS AND UWT EMAIL REQUIRED
Canvas and your UW email account will be used extensively for communication, announcements, assignments, lecture notes, exchange of ideas, and feedback. Check your UW email and the Canvas workspace daily for updates. All written assignments will be typed, double-spaced, APA citation style and submitted electronically in a WORD compatible format via Canvas.

GITHUB USE REQUIRED
Additionally, as part of the course objectives, we will be making extensive use of Git and GitHub as a means of storing, retrieving, and accessing data and code. This will be explained to you as part of your first lab.

CLASSROOM PRINCIPLES
This course will cover a variety of difficulty topics in a limited amount of time. As such, students are expected to come to class prepared and to actively participate in class. Working with technology, it is impossible to fully resist periodically checking email or other outside communications; however, please be respectful of others. Loud typing or browsing of distracting websites (lots of images/videos) will not be tolerated.
Late assignments will be marked down. While attendance is not mandatory, if you are going to miss extended class time, please let me know beforehand. Ask other students for missed notes and check Canvas for lecture slides.

GRADING/EVALUATION CRITERIA

- Weekly reading discussion (8% of course grade)
- Labs (52% of course grade)
- Final Project (25% of course grade)
- Final Project Presentation (15% of course grade)

Total: 100%

More information on the University of Washington's grading policies can be found here: http://www.washington.edu/students/gencat/front/Grading_Sys.html

Participation: Students are expected to attend all class sessions and to actively participate in class exercises and discussions. This means coming to class prepared and having completed any reading or other assignments.

Labs: There will be **six (6)** total labs for the class. A significant portion of class-time will be devoted to introducing and working through the labs; however, many will require additional work outside of class to complete.

Each lab is due at the **beginning** of class two weeks after its assignment. For example, the lab assigned during the **second** class is due at the start of the **fourth** class, and so on. Each lab will have its due date on it.

Late labs will be reduced points according to the following metric:

1 week late	-10%
2 weeks late	-15%
3 weeks late	-30%
More than 3	**Not accepted**

Labs are to be submitted using the Canvas system (and github for code).

Final Project: ***DUE 3/13/2018***
The final project is an opportunity for students to demonstrate their command of the material presented in the class. The students, working alone or in teams, will design and develop a tool for use with ArcGIS or other geospatial technology. This tool can accomplish a variety of tasks, but must not already exist, and is encouraged to focus on an area of research of interest to the student(s). For example, a project might create a Python script for ArcGIS that automates some means of data management, etc.

Students are encouraged to begin thinking about their project ***as soon as possible***. Meeting with the instructor during office hours to discuss the project is also encouraged.

The Final Project will consist of both a code (application/script) and a written report section. The written report is in the form of an extended abstract (which

covers methodology, purpose, and results) of 500-1000 words, not including citations.

Additional details on the Final Project, such as proposals, will be discussed in class over the course of the quarter.

Final Project Presentation: The final class of the quarter (**March 10, 2016**) will be devoted to student presentations of their final projects. Each presentation will be approximately 5 minutes in length and offers the students an opportunity to present their research ***without being assigned a final grade for the project itself***.

These presentations will be conducted in the same format as research/professional presentations. Additional details will be presented during the course of the quarter.

Formatting: Papers must be typed in 11-12-point font, and double spaced with standard margins. References are to be properly cited following the APA system.

Plagiarism: using another's words or ideas without proper citation, is a conduct violation. Ignorance of proper documentation procedures is the usual cause of plagiarism, although it does not excuse the act. Students are responsible for learning how and when to document and attribute resources used in written or oral presentations. For more information, please refer to the Academic Honesty: Cheating and Plagiarism document adapted by the Nursing Program at UW Tacoma:
http://www.tacoma.washington.edu/nursing/current_students/honesty.cfm

Extra-credit opportunities, such as attending specific research lectures or other activities on Campus, may be announced during the quarter.

Reading note: Assigned readings are to be completed ***for the class under which they are listed***. Therefore, the readings under the January 14th class are to be completed **by the start of that class**, and so on. No preparation is expected for the first class.

Lab note: Labs are listed under the class in which they are begun, not when they are due. Each lab will either be one or two weeks long and due dates will be on Canvas.

COURSE OUTLINE

Week 1 – January 4th

Course Introduction: Setting up ArcGIS, text editors, ArcGIS Review
Lab 1: Our 'first' Python Script, Our 'first' Git Commit

Week 2 – January 11th

The Nitty Gritty of Python and its Syntax.
Lab 2: Solving Problems with Python (non-Arc)
Reading: Chs. 1-4 of *Python Scripting*

Week 3 – January 18th

Data, Data, Data, I made you out of bits…
Lab 3: Capturing, processing, and displaying data (**lab 1 due)**
Reading: Ch. 5-7 of *Python Scripting* **and see Canvas**

Week 4 – January 25th

Geometries and Rasters
Lab 4: Working with geometries and rasters **(lab 2 due)**
Reading: Chs. 8-11 of *Python Scripting*

Week 5 – February 1st

Debugging and Functions
Lab 5: Working with packages and debugging code (**lab 3 due**)
Reading: Chs. 12-14 of *Python Scripting*

Week 6 – February 8th

APIs – getting our feet wet
Lab 6a: (Automatically) Making a (web) Map (**lab 4 due)**
Reading: See Canvas

Week 7 – February 15th

More APIs – Arc Pro, ArcGIS API for Python
Lab 6b: (Automatically) Making a better (?) (web) Map (**lab 5 due)**
Reading: Chs. 13-14 of *Python Scripting*

Week 8 – February 22nd

The more things change…
Bonus Lab (potentially)
Reading: See Canvas

Week 9 – March 1rd

Final Project working period (**lab 6a and 6b due**)
Reading: see Canvas

WEEK 11 – March 8th

Final Project Presentations
Lab: none
Reading: none

FINAL PROJECTS ARE DUE BY 5 P.M. ON MARCH 13, 2018

CAMPUS RESOURCES
Teaching and Learning Center - The Teaching and Learning Center (TLC) offers free academic support for students at all levels. For writing, reading, learning strategies and public speaking needs, please make an appointment online at: http://uwttlc.mywconline.com/index.php. Writing support is also available at our online writing center at: uwtwrite@u.washington.edu More information about our online writing center is available at: http://www.tacoma.washington.edu/tlc/writing/onlinewritingcenter.cfm For math, stats and quantitative needs, assistance is available on a drop-in basis in Snoqualmie 200. Please check our schedule at: http://www.tacoma.washington.edu/tlc/math/schedule.cfm. For special needs, please contact Ingrid Horakova at: horaki@u.washington.edu

Disabilities Accommodation – Disability Support Services (DSS) functions as the focal point for coordination of services for students with disabilities. In compliance with Title II of the Americans with Disabilities Act, any enrolled student at UW Tacoma who has an appropriately documented physical, emotional, or mental disability that "substantially limits one or more major life activities [including walking, seeing, hearing, speaking, breathing, learning and working]," is eligible for services from DSS. If you are wondering if you may be eligible for accommodations on our campus, please contact the DSS reception desk at 692-4522, or visit http://www.tacoma.washington.edu/studentaffairs/SHW/dss_about.cfm/

Inclement Weather Policy: Call (253) 383-INFO or check the UW Tacoma homepage to determine whether campus operations have been suspended or delayed. If not, but driving conditions remain problematic; call the professor's

office number (692-4761) and/or check Catalyst announcements. If the first two numbers have been contacted and the student is still unable to determine whether class will be held, call the Urban Studies program office number 692-5880 for updated information.