**[Python] Programming for Remote Sensing and GIS**

**GIS 5090-01 — Spring 2017**

**Class Time: Tuesday 4:20 AM - 6:50 PM**

**Location: Des Peres Hall 204**

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| Instructor: Gregory Brunner (Center for Sustainability)  Office Hours: Tuesday before class and scheduled upon request  Phone: 636-222-3818  E-mail: brunnergj@slu.edu |

**Course Description (Modified from what is listed in the Course Catalog):**

This course will introduce students to python programming. Through completing this course, students will be able to use Python to perform common GIS and remote sensing analysis tasks, automate workflows, and develop custom Python tools. Topics will include describing data, manipulating data, automating spatial analysis tasks, creating Python scripts and tools, and using Python for imagery analysis.

**Course Objectives:**

* Learn Python and understand how to use it to solve problems in GIS and Remote Sensing
* Encourage the use of Python through relevant examples and assignments
* Get graduate level students implementing it in their own research projects.

**Recommended Texts (Choose one):**

Silas Toms. ArcPy and ArcGIS – Geospatial Analysis with Python. ISBN978-1-78398-866-2. $44.99

Or,

Paul A Zandenbergen. Python Scripting for ArcGIS. ISBN 978-1-58948-282-1. $79.99

**Assessment & Grading:**

1. 20% - Lab Work
2. 20% - Homework
3. 30% - Midterm project
4. 30% - Final Project

**Grading Scale:**

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| --- | --- | --- |
| **Grade** | **Points** | **0-100% scale** |
| A | 4.0 | 93-100% |
| A- | 3.7 | 90-92.9% |
| B+ | 3.3 | 87-89.9% |
| B | 3.0 | 83-86.9% |
| B- | 2.7 | 80-82.9% |
| C+ | 2.3 | 77-79.9% |
| C | 2.0 | 73-76.9% |
| C- | 1.7 | 70-72.9% |
| D | 1.0 | 60-69.9% |
| F | 0.0 | 0-59.9% |

**Course Schedule**

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| --- | --- | --- |
| **Week** | **Class**  **Date** | **Discussion & Readings** |
| Intro | | |
| 1 | 1/17 | **Intro to Python**  **Python Basics**  **Python Fundamentals** |
| Arcpy | | |
| 2 | 1/24 | **More Fundamentals**  **Intro to Arcpy** |
| Working with Data | | |
| 3 | 1/31 | **Exploring and Describing Data**  **Loops and Lists** |
| Manipulating Data | | |
| 4 | 2/7 | **Manipulating Spatial Data**  **Text Files and CSV Files** |
| ETL | | |
| 5 | 2/14 | **ETL – Extract, Transform, Load**  **JSON – JavaScript Object Notation** |
| Geometries | | |
| 6 | 2/21 | **Working with Geometries** |
| Creating Script Tools | | |
| 7 | 2/28 | **Creating and Running Python Script Tools** |
| Rasters/Imagery | | |
| 8 | 3/7 | **Working with Rasters**  **Managing Imagery and Raster Data**  **\*Project 1 Due\*** |
| Numpy, Imagery, LiDAR | | |
| 9 | 3/21 | **Working with LiDAR**  **Python Raster Function** |
| Classes and Function | | |
| 10 | 3/28 | **Classes and Functions**  **Basic Analysis with Python** |
| Spatial Analysis | | |
| 11 | 4/4 | **Spatial Analysis**  **Space-Time Analysis** |
| Map Scripting | | |
| 12 | 4/11 | **Arcpy.Mapping**  **Map Automation** |
| Hipster Python | | |
| 13 | 4/18 | **Intro to ArcGIS Python Web API and Jupyter** |
| Intro to Pandas and Scipy | | |
| 14 | 4/25 | **Pandas**  **Scipy** |
| Final Projects Presented | | |
| 15 | 5/2 | **\*Final Projects Due\***  Each student will give a presentation on their final project. |
| Grades | | |
| 16 | 12/10 |  |