

# Python for ArcGIS Pro - Writing Scripts to Manipulate GIS Data

*Course Length:* 3 days

*ArcGIS Version:* 2.x

*App:* ArcGIS Pro

## Overview

Python is a scripting language used to automate tasks and create new functionality in ArcGIS Pro. Python scripts can be used to manipulate a map, execute geoprocessing commands, and read/write files. This three-day course takes a leveled approach to writing scripts; beginning with basic Python syntax and simple scripts, ending with scripts that read files, manipulate the information, and create GIS data. The course teaches the arcpy site package, using the Spyder IDE. This class is supplemented with a second course, Getting Started with the ArcGIS API for Python and Jupyter Notebooks, which covers the arcpy API for Python, Jupyter Notebooks, and interacting with web GIS.

## Audience

This course is for those who are already comfortable with the basics of ArcGIS Pro and want to learn how to write Python scripts to manipulate data, projects, and maps.

## Topics Covered

### Day 1

- Introduction to Python and the Spyder IDE – Learn about the Python scripting language, why it is useful, and begin with the basic building blocks of a script. (What is Python?; Writing Python Scripts; Python Syntax)
- Variables – Getting input from the user, storing that information in containers, and converting between different data types. (Variable Declarations; Strings and Numbers; Help and Resources)
- Object Oriented Scripting – Writing scripts that look at data and make decisions based on the properties it discovers. (Objects, Properties, and Methods; Decision Making)
- Modules and ArcPy – Accessing general, and ArcGIS-specific, functionality in Python. (Modules; ArcPy Site Package; ArcPy Methods; arcpy.env)

### Day 2

- Geoprocessing with Python – Accessing ArcGIS geoprocessing tools, licenses, and extensions in Python. (ArcToolbox; Calling Tools in Python; Licenses and Extensions; Error Handling)
- Lists and Loops – Reading through lists of information, such as all of the layers in a map document or all of the feature classes in a geodatabase. (Lists; Loops; List Methods)

- Maps – Manipulating the contents, layer properties, and other aspects of a map with Python. (The Big 3 Objects; Table of Contents)
- Data Access with Cursors – Accessing, modifying, or updating the data within a table using Python. (Tuples; Search Cursors; Update Cursors; Insert Cursors)

### Day 3

- Working with Geometry – Understanding how shapes are stored for GIS data and how that information is handled in Python. (Understanding Geometry; Python Objects for Geometry; Accessing Geometry)
- Custom Tools – Advanced Python techniques in the Field Calculator and creating custom ArcToolbox tools from Python scripts. (Custom Function Definitions; Script Arguments; Script Tools; ModelBuilder)
- File Input and Output – Work with directories and paths to read and write files, such as creating log files. (Working with Directories and Paths; Reading and Writing Files; File Tips and Tricks)
- Python tools for publishing.

## **Format**

In-person instruction with hands-on practice and course materials you can keep.

## **Prerequisites and Recommendations**

Attendees should have knowledge of Microsoft Windows® and be familiar with the basic use of ArcGIS Pro, including the topics covered in both the **Introduction to ArcGIS Pro** and **Intermediate ArcGIS Pro** classes.