

Python USGS Training Agenda

Part 1: Introduction to python for hydrologists

Monday

Introductions and getting started (Mike)

Python overview and Quick orientation to jupyter, environments, and hydroshare (Andy)

Python basics review: Q&A and discussion <https://cscircles.cemc.uwaterloo.ca/> (Mike)

Python basics: activity (-)

Functions and Scripts (A: build a function) (Joe)

Namespace, Modules, Packages, Objects (A: import and use own functions, etc) (Josh)

Sys, Os, Shutil, Pathlib (A: include custom import paths) (Andy)

Working with files, string formatting (Josh)

Recap and Questions

5:00 PM – Class Adjourn

Tuesday

Numpy (where, slicing, indexing,)(A: xmas for everyone) (Mike)

Matplotlib (A: make a semi-complex plot, animation, PdfPages) (Joe)

Theis exercise + VSCode IDE debugging, liveshare (Andy)

Pandas (interesting data, viz, excel, apply correction to data, indexing, grouping, retrieving data from NWIS (various approaches), Raul's

<https://github.com/raoulcollenteur/Python-Hydrology-Tools> (Josh)

4:30 PM – Recap and Questions

5:00 PM – Class Adjourn

Wednesday

9:00 AM – Pandas

GeoPandas for open-source GIS (Mike)

Projection, overlay, plotting, files, examples

Rasterio (Josh)

Files and interaction with numpy

Xarray (Andy)

Manipulate data and thredds - get the data

Wrap-up: Pointing to some other packages (Joe)

Scipy, sklearn,

Resources for help

Part 2: Application of Python and Flopy to Groundwater Modeling

Thursday

FloPy introduction (Mike)

Build your first model with FloPy (Joe)

FloPy load and visualize models (Andy)

New Intersection Capabilities, modelgrid (Josh)

Class project (refactor to Freyberg) – overview and start - incorporate modelgrid, intersect, resampling raster etc. (no input data in LRC - all coords) (ALL)

5:30PM – Class Adjourn

Friday

10:30 AM – Project Continued

1:00 PM – Run and process MF6T (Joe)

Run and process MODPATH models (Josh)

3:00 PM – Streamflow Capture Analysis with FloPy – use class project (Mike)

4:00 PM – Unstructured Grids Neuchatel stuff revisit with class project example (?) (Joe)

MODFLOW setup pick a test case (Andy)

5:00PM – Wrap Up

5:30 PM – Adjourn