**Python Course**

Half Days run from 8:30 - 12 pm

**Half Day 1 (3.5 Hours)**

* Course Intro - (15 minutes)
* What is Python and why use it? How does it compare to SQL, R, Excel - (15 minutes)
* Using Python with Notebooks / Google Collabs - (30 minutes)
* Basic Python Syntax (Strings, Numbers, Lists, Dictionaries, Tuples, Sets) - (45 minutes)
* Using Python Loops and building functions - (45 mines)
* Python packages and package management (OS, *Pandas*, *Numpy*, *Matplotlib*) - (30 minutes)
* Questions (30 minutes)

**Half Day 2 (3.5 Hours)**

* Refresh on the main Python package - (15 minutes)
* Loading data into Python (csv, text, excel, SQL, shapefiles) - (1 hour)
* Introduction to data loading, manipulation, and analysis with *Pandas* (1 hour)
  + What is *Pandas*
  + Loading data tables (e.g., CSV
  + Introduction to DataFrames
  + Viewing data in *Pandas*
  + Navigating within DataFrames
  + Data operations and transformations (e.g., adding columns based on operations)
  + Merging multiple CSV files into the same DataFrame
  + Data analysis and statistics using Pandas (e.g., descriptive statistics)
  + Export files
* Introduction to data visualization and plotting with *Matplotlib* - (1 hour)

            - What is *Matplotlib*

            - *Matplotlib* syntax and layout

            - How to create plots (histograms, scatter plots and best fit lines, bar charts, line plots)

            - Exporting figures

* Questions (15-30 minutes)

**Half Day 3 (3.5 Hours)**

* Intro to *Numpy* for Arrays + advanced mathematics/analysis (45 minutes)
* Subsurface data in Python (2 hour 15 minutes)
  + Importing and navigating well data (las files) with *Lasio*
  + Well log plots with *Lasio*
  + Statistical analysis of well data (descriptive statistics, data histograms, plots)
  + Log processing (e.g., normalization, upscaling)
  + Basic petrophysical functions as data frame operations (e.g., vhslae curve from GR logs, creating Pay-flags)
  + Simple mapping of subsurface data (using *Matplotlib* and *Geopands*)
* Questions (30 minutes)

**Half Day 4 (3.5 Hours)**

* Simple machine learning with *SciKit Learn*(e.g., K-means clustering of log data) - (45 minutes)
* Python Data Functions in Spotfire (45 minutes)
* Wrap and Discussion (1 hour)
  + other key Python packages
  + Ideas for what you could do with Python
  + Webscraping
* Questions (1 hour)