Data Visualization Course (BCN Activa)

Welcome to this introductory course on data visualization. In this course outline you will find all the information required for this course. The aim of this course is to introduce you to the world of data visualization with Python, as well as to understand basic concepts on data visualization, and will provide basic knowledge and processing tools for geospatial data and creating your own Dashboards.

Course Requirements:

- Basic to intermediate level of Python. E.g., define variables, define functions, basic understanding of Object-Oriented Programming, for-loops.
- Understand Pandas and basic data-processing techniques.
- Familiarity with different types of tabular datasets.
- Basic familiarity with the Terminal.
- Basic understanding of GIS and spatial data.
- It is strongly recommended to use Linux or MacOs, even if it is with a Virtual Machine[1].

By the end of this course, you will be able to:

- Have your own environment set up for using python and creating Jupyter Notebooks to visualize data in a professional manner.
- Perform basic visual exploratory data analysis with python and *Matplotlib*.
- Perform more advanced and personalized plots with *Matplotlib*.
- Understand geographic data and plot maps with *Geopandas.*
- Create your own Dashboard with *Plotly*.

Course Outline:

1. Introduction to Python: installation of Anaconda for python, installation of *Pandas*, *Matplotlib*, *Geopandas* and *Plotly*. (2 hour session).

This class will focus on the requirements and the installation of all the tools required for this course. Then we will explain basic commands with bash on the Terminal, as well as some first hands-on data wrangling and plot of data with Python and *Matplotlib*.

2. Basic Visual Exploratory Data Analysis (2 hour session)

In this class we will perform basic visual exploratory analysis, as well as some data management, and perform basic functions for data pre-processing. Finally, we will show some ways to combine datasets and extract the most out of them (E.g. merge, concatenate and join).

[1] We discourage the use of Windows in this course.

3. Basic Plotting tools (Various types of plots, customize axis, colors, transparency, aspect ratio, etc…) (4 hour session)

This class will continue with the data wrangling performed in the previous class, and will show some more advanced techniques, as well as ways in which you can improve your plot design and

4. Map design, GIS and operations with spatial data (4 hour session)

This class will dive into the different types of spatial data, how to read them, explore them and lastly visualize them. All of the analysis will be performed using *Pandas*, *Geopandas* and *Matplotlib*.

5. Dashboards (2 hour session)

This last class will introduce you to dashboards, show some good examples and teach you how to design, implement and run your own dashboard with *Plotly*.

Bibliography:

The Functional Art – *Alberto Cairo*
The Truthful Art – *Alberto Cairo*
Visualization Analisys and Design – *Tamara Munzner*
Data Visualisation: A Handbook for Data Driven Design – *Andy Kirk*

Lastly, this course has been inspired by this amazing course from Eduardo Graells-Garrido, kudos to him!