

# **Python Summer**

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# Table of contents

<b>Summary</b>	<b>3</b>
Objectives . . . . .	3
Organization . . . . .	3
Resources . . . . .	3
<b>1 Python Basics &amp; Objects</b>	<b>4</b>
1.1 Objectives . . . . .	4
1.2 Topics . . . . .	4
1.3 Content . . . . .	4
<b>2 Functions, Lists, Dictionaries &amp; Classes</b>	<b>5</b>
2.1 Objectives . . . . .	5
2.2 Topics . . . . .	5
2.3 Content . . . . .	5
<b>3 Files, Data &amp; Practice</b>	<b>6</b>
3.1 Objectives . . . . .	6
3.2 Topics . . . . .	6
3.3 Content . . . . .	6
<b>4 Numpy</b>	<b>7</b>
4.1 Objectives . . . . .	7
4.2 Topics . . . . .	7
4.3 Content . . . . .	7
<b>5 Pandas</b>	<b>8</b>
5.1 Objectives . . . . .	8
5.2 Topics . . . . .	8
5.3 Content . . . . .	8

# Summary

This course introduces fundamentals of programming using Python.

Learning Python basics for data analytics

## Objectives

- Learn basic programming with Python
- Write basic Python code
- Calculations using NumPy arrays (basics)
- Basic data analysis using pandas

## Organization

- Language: English/French
- Lab-based courses on Colab
- 5 courses of 1.5 hours: should attend the 5 sessions
- Self-learning: point to videos and/or tutorials (notebooks) covering topics seen in the courses, going a bit further, or introducing concepts of the following course

## Resources

[Colab](#)

[The Python Tutorial](#)

[Python For Beginners](#)

[Python, Jupyter, Numpy](#)

[Python course for data analysis](#)

# 1 Python Basics & Objects

## 1.1 Objectives

- Introduction to Google Colab
- How to write simple Python code
- Use variables, numbers, text, conditions, and loops
- Understand that everything in Python is an “object”

## 1.2 Topics

- Numbers, strings, booleans
- Variables, Operators
- if, else, for, while
- print() and input()
- Object methods like .upper() on strings

## 1.3 Content

[Slides](#) [Slides](#) [PDF](#)

## 2 Functions, Lists, Dictionaries & Classes

### 2.1 Objectives

- Write code with functions
- Understand and manipulate lists and dictionaries
- Understand what a class is and implement a simple class

### 2.2 Topics

- define functions
- Lists and their methods
- Dictionaries (key-value pairs)
- Classes: `__init__`, `self`, attributes, and methods

### 2.3 Content

[Slides](#) [Slides](#) [PDF](#)

# 3 Files, Data & Practice

## 3.1 Objectives

- Install/Import packages
- Read and write files
- Work with json data (like spreadsheets)
- Practice previous concepts (functions, classes, dict, etc.) using data

## 3.2 Topics

- Opening and reading files (.txt or .csv)
- Load a JSON file into Python using the json module
- Work with lists of dictionaries as datasets
- Practice building objects from data, use object in lists, etc.

## 3.3 Content

[Slides](#) [Slides](#) [PDF](#)

# 4 Numpy

## 4.1 Objectives

- Use numpy for working with numbers and tables of numbers
- Do fast math on arrays (instead of writing loops)
- Introduction to indexing, broadcasting

## 4.2 Topics

- Create arrays with numpy
- Reshape and slice arrays
- Do stats with `.mean()`, `.sum()`, etc.
- Work along rows or columns (axis)
- Intro to broadcasting

## 4.3 Content

[Slides](#) [Slides](#) [PDF](#)

# 5 Pandas

## 5.1 Objectives

- Use pandas to work with CSV data
- Load, filter, group, and summarize data
- Introduction of Matplotlib for visualization

## 5.2 Topics

- DataFrame and Series basics
- Load CSV files
- Filter rows, select columns
- Compute stats
- Handle missing data
- Simple plots

## 5.3 Content

[Slides](#) [Slides](#) [PDF](#)