

# Programming with Python

**Lecturer: Massimo Ballerini**

## Language

English

## Course description and objectives

The course aims at providing students with the basic elements of the programming language Python and its applicative domains: artificial intelligence, multimedia and games, automation, scripting, graphical user interfaces, networking, machine learning, etc.

Students will acquire all the basic concepts about the programming process with Python, how to use data structures, and how to import external libraries.

Specifically, at the end of the course, students will be able to:

- Implement both simple and complex algorithms
- Select and use external Python libraries and functions to develop real software projects

## Audience

The course is open exclusively to first-year students of the Master's Degree Programs at Bocconi University and is part of the Curricular Integrative Activities that are worth 2 credits (subject to 75% attendance and to passing the final test).

## Prerequisites

It is useful to know, at least in general, the logic of computer programming.

## Duration

24 hours

## Calendar

Lecture	Date	Time	Room
1	Wed 24/10/2018	18.00 - 19.30	Info AS05
2	Thu 25/10/2018	18.00 - 19.30	Info AS05
3	Tue 06/11/2018	18.00 - 19.30	Info U01
4	Thu 08/11/2018	18.00 - 19.30	Info AS05
5	Tue 13/11/2018	18.00 - 19.30	Info 6
6	Thu 15/11/2018	18.00 - 19.30	Info AS05
7	Tue 20/11/2018	18.00 - 19.30	Info AS05
8	Thu 22/11/2018	18.00 - 19.30	Info AS05
9	Tue 27/11/2018	18.00 - 19.30	Info AS05
10	Thu 29/11/2018	18.00 - 19.30	Info AS05
11	Tue 04/12/2018	18.00 - 19.30	Info AS05
12	Thu 06/12/2018	18.00 - 19.30	Info AS05

## Syllabus of the course

Lesson	Topics
1	<p><b>Introduction to Python</b></p> <ul style="list-style-type: none"> <li>- Short Introduction to the language</li> <li>- Why to use version 3 and how to install it</li> <li>- IDLE and other development interfaces (Anaconda, PowerShell, ...)</li> <li>- Execution modes               <ul style="list-style-type: none"> <li>o From the shell</li> <li>o From the editor</li> </ul> </li> <li>- Where to find support: comments, online help, documentation, community</li> </ul> <p><i>Exercises</i></p>

Lesson	Topics
2	<p><b>Variables and elementary data types</b></p> <ul style="list-style-type: none"> <li>- Variables as memory references</li> <li>- Variables creation and update with the assignment instruction</li> <li>- Numeric types and string type</li> <li>- Introduction to modules (libraries) and built-in functions</li> <li>- Calculations and execution priorities</li> <li>- Input and output</li> <li>- Conversion of data types</li> </ul> <p><i>Exercises</i></p>
3	<p><b>Programming – part 1: conditional constructs and errors</b></p> <ul style="list-style-type: none"> <li>- Simple and nested <i>if (elif)</i></li> <li>- Logical operators (<i>and, or, not</i>)</li> <li>- Conditional operators</li> <li>- Types of errors</li> <li>- Debug and test of a program</li> <li>- Error handling: <i>try</i> and <i>except</i></li> </ul> <p><i>Exercises</i></p>
4	<p><b>Programming – part 2: iterative constructs</b></p> <ul style="list-style-type: none"> <li>- <i>for</i> and <i>while</i> loops</li> <li>- Nested cycles</li> <li>- Forced exit from cycles: <i>break</i> and <i>continue</i> instructions</li> <li>- How to nest different types of structures</li> </ul> <p><i>Exercises</i></p>
5	<p><b>Programming – part 3: functions</b></p> <ul style="list-style-type: none"> <li>- Defining a function</li> <li>- Input parameters: mandatory and optional arguments</li> <li>- Output: productive and empty functions</li> <li>- Recursive functions</li> </ul> <p><i>Exercises</i></p>
6	<p><b>Complex data structures – part 1: what they are</b></p> <ul style="list-style-type: none"> <li>- Structures taxonomy</li> <li>- Strings, tuples and lists: indexing and slicing</li> <li>- Dictionaries: keys and values</li> <li>- How to create, edit, delete elements in a data structure</li> </ul> <p><i>Exercises</i></p>
7	<p><b>Complex data structures – part 2: how to interact</b></p> <ul style="list-style-type: none"> <li>- Strings: methods and functions</li> <li>- Tuples: methods and functions</li> <li>- Lists: methods and functions</li> <li>- Dictionaries: methods and functions</li> </ul> <p><i>Exercises</i></p>

Lesson	Topics
8	<b>Complex data structures – part 3: custom classes</b> <ul style="list-style-type: none"> <li>- The concept of class and instance</li> <li>- Attributes and methods</li> <li>- Inheritance</li> <li>- Overloading and overriding</li> </ul> <i>Exercises</i>
9	<b>Working with the standard library modules</b> <ul style="list-style-type: none"> <li>- Use of the standard library</li> <li>- Examples of standard library modules</li> </ul> <i>Exercises</i>
10	<b>Working with modules of third-party libraries</b> <ul style="list-style-type: none"> <li>- Search, installation and use of external modules</li> <li>- Read and write text files</li> <li>- Read and write Excel files</li> </ul> <i>Exercises</i>
11	<b>Summary Exercise</b>
12	<b>Q&amp;A</b> <b>Final test (mandatory)</b>

## Software

Python 3.x with IDLE

## Suggested bibliography

*Think Python*, 2<sup>nd</sup> edition. Allen Downey, O'Reilly, Green Tea Press, 2015.  
 The free pdf version is available [online](#)

Reference web links:

- Official site: <https://www.python.org/>
- Official documentation: <https://docs.python.org/3/>
- Repository of official external modules: <https://pypi.org/>

## Available seats

100, reserved to first-year students of the Master's Degree Programs