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

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<tr>
<th>Lecture</th>
<th>Date</th>
<th>Time</th>
<th>Room</th>
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<tr>
<td>1</td>
<td>Wed 24/10/2018</td>
<td>18.00 - 19.30</td>
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<td>Thu 25/10/2018</td>
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## Syllabus of the course

### Lesson 1: Introduction to Python
- Short Introduction to the language
- Why to use version 3 and how to install it
- IDLE and other development interfaces (Anaconda, PowerShell, ...)
- Execution modes
  - From the shell
  - From the editor
- Where to find support: comments, online help, documentation, community

*Exercises*
<table>
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<tr>
<th>Lesson</th>
<th>Topics</th>
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| 2      | Variables and elementary data types  
- Variables as memory references  
- Variables creation and update with the assignment instruction  
- Numeric types and string type  
- Introduction to modules (libraries) and built-in functions  
- Calculations and execution priorities  
- Input and output  
- Conversion of data types |
| Exercises |
| 3      | Programming – part 1: conditional constructs and errors  
- Simple and nested if (elif)  
- Logical operators (and, or, not)  
- Conditional operators  
- Types of errors  
- Debug and test of a program  
- Error handling: try and except |
| Exercises |
| 4      | Programming – part 2: iterative constructs  
- for and while loops  
- Nested cycles  
- Forced exit from cycles: break and continue instructions  
- How to nest different types of structures |
| Exercises |
| 5      | Programming – part 3: functions  
- Defining a function  
- Input parameters: mandatory and optional arguments  
- Output: productive and empty functions  
- Recursive functions |
| Exercises |
| 6      | Complex data structures – part 1: what they are  
- Structures taxonomy  
- Strings, tuples and lists: indexing and slicing  
- Dictionaries: keys and values  
- How to create, edit, delete elements in a data structure |
| Exercises |
| 7      | Complex data structures – part 2: how to interact  
- Strings: methods and functions  
- Tuples: methods and functions  
- Lists: methods and functions  
- Dictionaries: methods and functions |
| Exercises |
Lesson | Topics
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8 | **Complex data structures – part 3: custom classes**
  - The concept of class and instance
  - Attributes and methods
  - Inheritance
  - Overloading and overriding

**Exercises**

9 | **Working with the standard library modules**
  - Use of the standard library
  - Examples of standard library modules

**Exercises**

10 | **Working with modules of third-party libraries**
  - Search, installation and use of external modules
  - Read and write text files
  - Read and write Excel files

**Exercises**

11 | **Summary Exercise**

12 | **Q&A**
  - Final test (mandatory)

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**Software**

Python 3.x with IDLE

**Suggested bibliography**

The free pdf version is available [online](https://www.python.org/)

Reference web links:
- Official site: [https://www.python.org/](https://www.python.org/)
- Official documentation: [https://docs.python.org/3/](https://docs.python.org/3/)
- Repository of official external modules: [https://pypi.org/](https://pypi.org/)

**Available seats**

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