UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Introduction To Computer Science (blended)

2223-1-E4102B067

Learning objectives

The course will introduce basic concepts on the architecture of computers, hardware, software, operating systems, software development and the path from data to information.
The course will focus on the development of programs to access data, to manipulate the information and to represent it.
On completion of this course, students will be able to solve problems using a programming language and computing tools.

Contents

- Information elaboration
- Hardware/Software
- Operating Systems
- Programming: the python language
- Variables, Conditional Instructions, Loops
- Complex Data Structures
- Files
- Functions and Procedures
- Libraries

Focus on data:

- semistructured and structered data
- tables and their manipulation
- data visualization

Detailed program

- Elaboration of the information
- Sketches of Hardware/Software
- Operating Systems
- Command Line Interface e Graphic User Interface
- Sketch of the File System
- The Unix File System and the Widows File System
- Programming paradigms
- Introduction to algorithms
- From algorithms to programs
- Programming languages (interpreter/compiler)
- Programming in Python
    - Structure of a source file
    - Instructions
    - Variables
    - Boolean logic
    - Design and execution environments for Python
    - Conditional instructions
    - Input Output
    - Functions
    - Actual and formal parameters
    - Modules, Packages and Packages Manager
    - Complex data structures (tuples, lists, dictionaries)
    - Complex data structures and iterators
    - File
    - Working with textual files
    - Information representation
- Focus on Data:
    - Libraries to manipulates tabular data
    - Libraries to visualize data

Prerequisites

None

Teaching methods

Frontal lecture
Blended E-Learning (videos, tests to fix the contents, auto-evaluation tests)
Hands-on session in a computer science laboratory
Final test simulation (to introduce the student to the test platform and help him to gain knowledge about his/her preparation level)

Assessment methods

The examination consists of a written part held in a computer lab. The examination consists of two parts: the first one, composed by multiple choices questions; the second one, requires to solve an exercise by means of a program developed in Python. The mixed nature of the written test allows to verify the specific knowledge of the student, together with its ability to build a logic path to tackle and solve a problem.

Facultative Optional oral exam (on request of the teacher or of the students). The oral exam can both increase or decrease the overall evaluation.

Textbooks and Reading Materials

- All the material presented during the lectures will be published on this web site.
- Books:
    - Deitel, Introduzione a Python. Per l'informatica e la data science, Pearson. More details here
    - T. Gaddis, Introduzione a Python. Pearson. More details here.
    - A. Downey, J. Elkner, C. Meyers. “Pensare da informatico, Imparare con Python”, is the italian version of “How to Think Like a Computer Scientist”, Green Tea Press, Wellesley, Massachusetts. The EBook can be easily retrived form the web. Some links: pdf format, html format.

Semester

I semester

Teaching language

Italian

Sustainable Development Goals

QUALITY EDUCATION