UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Computer Science - 3

2425-2-E3303M011-T3

Learning objectives

The course aim is to introduce the basic skills in software programming in Python, focusing on the elementary data structures used in data analysis, and on relational databases.
At the end of the course, the student will be able to express simple SQL queries and design algorithms and implement them in Python in order to process data to solve specific problems.

Contents

The notion of algorithm, fundamental constructs in Python, elementary data structures and tables, functions, writing and reading files, SQL queries

Detailed program

1. Definition of algorithm
2. The Python language

- `structure of a program`
- `variables and data types: bool, int, float, str, tuple, list.`
- `arithmetic, relational, and logical expressions.`

- predefined functions: abs, len, list, max, min, range, str, sum.
- elementary instructions: assignment, return, break, continue, import.
- compound statements: if, for, while, with
- Reading and writing instructions: input, print, from text file
- definition of functions.
- Notes on the pandas library: DataFrame, input and output (read_excel, read_csv, to_excel, to_csv), indexing of a DataFrame, calculation of indicators (sum, min, max, mean, median, mode).

3. Relational databases and SQL: CREATE, DROP, ALTER, INSERT, UPDATE, DELETE,SELECT

Prerequisites

Mathematical,logical, statistical knowledge as acquired during high-school.

Teaching methods

Frontal lessons. Lessons take place in computer science lab to allow students to immediately apply the concepts explained.

Assessment methods

Learning assessment includes a written exam and, if the student gets a passing grade, an oral exam. The written exam will take place in the teaching laboratories to evaluate the student's skills in using software development kit and their competence in solving simple problems.

Textbooks and Reading Materials

- For 1 and 2: **Think Python First Edition, by Allen B. Downey** (disponibile online) or **A. Lorenzi, E. Cavalli, V. Moriggia. Linguaggio Python. Atlas**
- For 3: **A. Lorenzi, D. Rossi. Le basi di dati. Il linguaggio SQL. Atlas**

Semester

Second semester.

Teaching language

Italian

Sustainable Development Goals

QUALITY EDUCATION