



## MEDETEC SHOOL

**Course: Computer Science**

**Year (1<sup>st</sup>-2<sup>nd</sup>-3<sup>rd</sup>-4<sup>th</sup>-5<sup>th</sup>-6<sup>th</sup>): 2nd**

**Period (1<sup>st</sup>-2<sup>nd</sup> semester – annual): 1st**

**Credits: 5**

### Objectives

The Computer Science course introduces problem solving through computer programming, with the following objectives: i) to develop a consistent methodology for solving problems, ii) to present the fundamental aspects of the Python programming language, and iii) illustrate the problem solving process with Python through a variety of interesting examples, either framed in the engineering or medical environment.

At the end of the course, students will acquire:

#### Knowledge and understanding

Students will acquire knowledge on and understanding of basic elements of computer programming and algorithms and will be able to demonstrate:

- knowledge of how information is stored and handled in a computing system
- knowledge of the Python programming language syntax and semantics
- knowledge of the main statements typical of imperative programming languages to manipulate data

#### Ability to apply knowledge and understanding

Students will use the acquired knowledge to achieve the following goals:

- select and design data structures to effectively store information
- given a simple problem framed in the engineering or medical environment, design algorithm for its efficient resolution
- implement the algorithm in Python

#### Making judgements

Students will acquire knowledge on how to interpret data aiming at formulating a subjective judgement:

- evaluate the correctness of the proposed algorithm
- evaluate the appropriateness of the proposed algorithm/program for solving the given problem



## Prerequisites

Basic ability to use a personal computer

## Contents

The course is organized in lectures and practical sessions, and will cover the following topics:

- basic computer architecture
- information representation (integers, floating points, characters)
- fundamental aspects: structure of a Python program, built-in basic types and arithmetic/logical operators, statements, input/output, basic control structures/statements
- complex data types (lists, dictionaries, sets) and built-in methods
- functions, parameters and scopes
- files
- data manipulation and visualization

## Teaching Methods

The course is organized in frontal lectures introducing the key concepts and problem solving strategies using Python and practical sessions where exercises and small projects will be proposed and solved by writing Python programs. Lectures and practical sessions will provide the problem solving and programming abilities and skills that will be verified during the exam sessions.

## Verification of learning

The exam can be taken in each one of the scheduled sessions in January-February, July and September.

Course assessment is performed on the day of the exam, during a 90-120 minutes session (open book / using the computer), consisting of 4-5 problems to be solved using Python to develop a program that solves the given problem. Problems will be of similar complexity as the ones proposed and solved in class.

The exam is passed upon obtaining a score equal or greater than 18/30, being the maximum score 30/30.

## Texts

M. Lutz, "Python Pocket Reference", O'Reilly

J. Hunt, "A Beginners Guide to Python 3 Programming", Springer