## **Programming 2**

- 1. Course number and name: 020IF2CI3 Programming 2
- 2. Credits and contact hours: 4 ECTS credits, 2x1:15 contact hours
- 3. Name(s) of instructor(s) or course coordinator(s): Maroun Boulos
- 4. Instructional materials: Course handouts, slides
- 5. Specific course information
  - a. Catalog description:

This course covers LIFO and FIFO structures - Topics include a systematic study of existing sorting algorithms and how to calculate their time complexity. It also covers the basic concepts of object-oriented programming and their application to data abstraction by introducing the concepts of object instantiation, attributes, and methods. It also covers an introduction to relational databases.

- **b. Prerequisites:** 020IF1CI2 Programming 1
- c. Required/Selected Elective/Open Elective: Required
- 6. Educational objectives for the course
  - a. Specific outcomes of instruction:
    - Design and construct algorithms to solve scientific problems
    - Use POO
    - Create simple request with SQL
    - Explain and write the code for the sorting algorithms
    - Analyze asymptotic behavior of sorting algorithms
    - Write the code for recursive sorting algorithms using recursive functions
    - Calculate time complexity for the sorting algorithms

## b. PI addressed by the course:

| PI       | 1.2 | 1.3 |
|----------|-----|-----|
| Covered  | X   | X   |
| Assessed | X   | X   |

## 7. Brief list of topics to be covered

- Introduction to sorting algorithms (1 lecture)
- Time complexity and asymptotic analysis of an algorithm (2 lectures)
- Bubble sort: algorithm and time complexity (1 lecture)
- Selection sort: algorithm and time complexity (1 lecture)
- Simple and binary insertion sort: algorithms and time complexity (2 lectures)
- Recursive algorithms: concept and examples (2 lectures)

- Merge sort: algorithm and time complexity (2 lectures)
  Quick sort: algorithm and time complexity (2 lectures)
  Lab sessions (numpy/scilab/matplot lib, scipy...) (5 lectures)
  POO (6 lectures)