# Programming 2

1. **Course number and name:** : 020IF2CI3 Programming 2

2. **Credits and contact hours:** 4 ECTS credits, 2 x1:15 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 | 1.3 | 2.4 | 7.1 |
   |---|---|---|---|
   | **Covered** | x | x | x |
   | **Assessed** | x | 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)