

Programming 3

1. **Course number and name:** : 020IF3CI4 Programming 3
2. **Credits and contact hours:** 2 ECTS credits, 2 x1:15 contact hours
3. **Name(s) of instructor(s) or course coordinator(s):** Maroun Boulos
4. **Instructional materials:** Course handouts

5. Specific course information

a. Catalog description:

Programming and algorithms with Categorical Abstract Machine Language (CAML) – variables, arithmetic expressions and operators, primitive data types, data input and output, built-in composite data types, simple statements, control statements, logical expressions, relational and logical operators, function definition and call, functions from external modules – array – dynamic programming – recursive structures (lists, trees) – LIFO – FIFO – complexity – graph – propositional logic – deterministic and non-deterministic finite state automata – regular expressions

b. Prerequisites: 020IF1CI2 Programming 1

c. Required: Required

6. Educational objectives for the course

a. Specific outcomes of instruction:

- Design and construct algorithms to solve scientific problems
- Write the code for recursive sorting algorithms using recursive functions
- Calculate time complexity for the sorting algorithms
- Construct automata to recognize given language

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 CAML, simple statements using print function and arithmetic operators (1 lecture)
- Variables, expressions, data types, conversion between data types, input function (1 lecture)
- Logical tests and conditional control structures (1 lecture)
- Functions from external modules (1 lecture)
- Iterative control structures (while and for loops) (1 lecture)

- Function definition and call (1 lecture)
- Recursion (2 lectures)
- Array and iterative algorithms, their traversal, searching through them, selecting elements, sort (1 lecture)
- Lists recursive constructions and recursive algorithms, their traversal, searching through them, selecting elements, sort (2 lectures)
- Trees and graphs (2 lectures)
- Deterministic and non-deterministic finite state automata – regular expressions (2 lectures)
- Propositional logic (1 lecture)