



Education within the reach of all  
A Ministry of Calvary Chapel-Port-au-Prince  
(509) 2209-5686 - [administration@uespoir.edu.ht](mailto:administration@uespoir.edu.ht) - [www.uespoir.edu.ht](http://www.uespoir.edu.ht)

## Syllabus

### Course Title

### ALGORITHMS

- I. **Prerequisites:** Programming in Python
- II. **Co-requisites:** Knowledge of data structures

This course is inspired by the INF2010 course at Polytechnique Montréal offered in Winter 2019 and an introductory algorithms course given at MIT in Spring 2020.

### III. Objectives

The main objectives of this course are:

1. Familiarize students with basic manipulations on fundamental data structures.
2. Instill in students a concern for the performance of algorithms they will use and design in their profession.
3. Introduce students to algorithmic approaches for solving classical problems in computer engineering.

### IV. General Objectives of Laboratories

The laboratory sessions allow students to:

- Familiarize themselves with the Python programming language.
- Implement data structures and algorithms and study their performance, compare them,

and find the ones best suited for specific problems.

## V. Course Content

- General introduction, Object-oriented programming with Python.
- Basic manipulation of sequential data structures: insertion, removal, and search of elements. Performance of algorithms on these structures.
- Manipulation of hash tables.
- Sorting algorithms. Recap of simple sorting algorithms (insertion and selection). Recursive sorting (merge sort and quicksort).
- Search, insertion, and removal of elements in a tree.
- Advanced tree structures, balanced trees.
- Priority queues. Definition and examples of applications. Implementation. Heap. Heapsort.
- Data structures for text manipulation.
- Strings (definition and operations).
- Dynamic programming.
- String filtering (pattern matching). Graphs.
- Implementation: adjacency matrices and adjacency lists.
- Graph traversal algorithms (breadth-first, depth-first, and backtracking). Advanced graph structures.
- Review and/or synthesis