Course Title	**Data Structures and Algorithms**				
Course Code	**CSC201**				
Course Type	**Major Elective**				
Level	BSc/1st Cycle				
Year / Semester	2nd/3nd				
Teacher's Name	Charr Jean- Claude				
ECTS	7.5	**Lectures / week**	3 hours	**Laboratories / week**	2. hours
Course Purpose and Objectives	The course will introduce students to the basic concepts of data structures, as well as their usefulness in various computer functions. Structures such as tables, stacks, queues, linked lists, trees, and charts will be discussed and analyzed. Students will develop algorithms and learn to operate and handle these structures effectively. Finally, an analysis of the complexity of the spatial time of the algorithms will be presented.				
Learning Outcomes	Upon completion of the course, students are expected to be able to: • Analyze the program with time complexity and its expression with notation Oh, Omega and Theta. • Classify and evaluate linear and nonlinear data structures. • Solve computer problems using programs with abstract data structures. • Solve computer problems by applying different algorithms.				
Prerequisites		**Required**	-		
Course Content	Introduction and basic concepts of data structures: Definition and application of data structures The definition of an algorithm, and the difference between an algorithm and a program Program creation and analysis. Asymptotic notation and numeric, O-notation. Complexity of search and classification algorithms. Retrospective mathematical function, a problem set up repeatedly Mathematical induction Comparison of iterative and retrospective solutions Strategies divide and reign Retrospective withdrawal Linked lists: Apply a linked list Index on linked list				

	Import and delete on linked lists Effectiveness of these functions and comparison of linked lists with successive storage structures Algorithms for deleting and adding to linked lists Stacks and queues: Definition Creating a Stack Delete, return and add item from a stack Algorithms for adding and deleting data from a stack. Create a queue Deleting the front tail item Add item to the back of the queue Algorithms for deleting and adding queues. Sorting and searching: O (n2) and O (nlogn) sorting techniques Linear and binary search, greedy and split and baseline algorithms Fragmentation. Trees. Theory of Graphs. What a graph What a path and a circuit Directed and non-written The breadth and depth Graph search, graph representation graphs as abstract data structures.
Teaching Methodology	Lectures 42 hours Labs 30 hours
Bibliography	Data Structures, E. Balagurusamy, 2019 Mc Graw Hill Introduction to JAVA programming and Data Structures, Lang Daniel, 2019, Pearson
Assessment	Final Exam 60% Mid-Term/Lab Exam 20& Assignments 20%
Language	English