Course Name: Data Structures & Algorithms **Course Code:** COMP321

General Information						
Course Code	**COMP321**	**Level/Year**	**5/3**	**Required (R) / Selected Elective (SE)**		**R**
Credit Hours	**Theory**	**2**	**Lab**	**1**	**Total**	**3**
Prerequisites	**COMP213**	**Course Coordinator**		Mr. Mohammad Haseebuddin		
Corequisites	**Nil**					

Course Description

This course focuses on the study and implementation of various data Structures-Arrays, Linked lists, Stacks, Queues, Trees and Graphs. The course introduces the asymptotic complexity and performance measurement of simple algorithms. The topic includes the concepts of hashing, hash-tables, implementation and analysis of Sorting Algorithms-Bubble Sort, Insertion Sort, Selection Sort and Searching algorithms- Linear Search, Binary Search.

Course Objectives : On completion of the course, the student will be able to:

- Explain various linear and nonlinear data structures.
- Introduces the concepts of asymptotic complexity and compute the efficiency of algorithms.
- Describe how to choose the appropriate data structure required to solve some simple problems.
- Demonstrate the implementation of the various data structures and their algorithms using Java programming.
- Illustrate the methods to analyze and calculate the complexity and efficiency of algorithms and data structures.

Course Contents

List of Topics

CH 1: An Introduction to Data Structure and Algorithm Analysis

CH 2: Linked Lists

CH 3: Stacks & Queues

CH 4: Trees

CH 5: Priority Queues & Heaps

CH 6: Hashing

CH 7: Graphs

Textbook

- Nell Dale, Daniel T. Joyce, and Chip Weems., Object-Oriented Data Structures Using Java, Fourth Edition, 2018.

Reference Materials	
• Narasimha Karumanchi, Data Structures and Algorithms Made Easy in Java: Data Structure and Algorithmic Puzzles, Second Edition, 2020 • Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, Data Structures and Algorithms in Java, 6th Edition, 2014.	
Course Learning Outcomes	
CLO#01	**Describe** the properties of various linear and nonlinear data structures and their usage.
CLO#02	**Define** the concepts of hashing and collision handling methods.
CLO#03	**Evaluate** the complexity and efficiency of algorithms and data structures.
CLO#04	**Apply** appropriate data structures for solving a given computing problem.
CLO#05	**Implement** various data structures and their algorithms using Java programming.
CLO#06	**Demonstrate** the ability to work in a team to choose and apply appropriate data structures to solve a given problem.