CCS210 - Data Structures and Algorithms

Module Code	CCS210	**Module Title**	Data Structures and Algorithms			
Credits	3	**Hours/Week** (For 15 weeks)	Lectures	2	**Pre/Co – requisites**	CCS100
			Practical	2		
GPA/ NGPA	GPA		Tutorial	1		

Aims

Impart the knowledge about data collections such as stacks, queues, heaps, sets, hash sets, trees and graphs and associated algorithms available to manipulate data represented in such collections using a high-level programming language and the complexity of algorithms.

Learning Outcomes

At the end of the module the student will be able to:

1	Use a suitable algorithm to solve given problem.
2	Use a suitable data structure to represent a given problem.
3	Characterize the performance of a non-trivial algorithm.
4	Solve non-trivial problems using suitable data representation(s) and algorithm(s)..

Outline Syllabus

1	**Linear data structures [5 h]:** Linked-lists, stacks, queues, their implementation strategies and their applications.
2	**Hashing and sets [5 h]:** has functions, set ADT, collision handling, performance implications, applications..
3.	**Simple algorithms [3 h]** bubble, selection, insertion sort. Linea search..
4.	**Algorithmic complexity [2 h]:** Framework for Management and control, Collection of data, Project termination, Visualizing progress, Cost monitoring, Earned Value Analysis, Project tracking, Change control, Software Configuration Management, Managing contracts, Contract Management.
5.	**Trees [5 h r]:** Tree ADT, implementation strategies, traversals, binary search trees, balanced trees. Example applications.
6.	**Graphs [10 h r]:** Graphs ADT, implementation strategies, graph algorithms, weighted and directed graphs.

	Applications.

Mapping of Learning Outcomes to Program Outcomes and Assessment Methods for each Learning Outcome

	Assessment Method	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13
LO1	Continuous, mid-semester, end-semesters	H	M	M										
LO2	Tutorials, Mid-semester, assignments Final exam	H	H	M										
LO3	Tutorials/assignment, Mid-semester exam, Final exam	L	M	M										
LO4	Teamwork	H	H	M										
Overall Contribution to POs		**H**	**H**	**M**										

Recommended Textbooks

1. *A. V. Aho, J. D. Ullman and J. E. Hopcroft, Data structures and algorithms, Pearson, 1983.*
2. *R. Sedgewick and K. Wayne, Algorithms, Addison-Wesley, 4th Edition, 2011.*

Lecturer in Charge	TBA