

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Module-5

GRAPHS: The Graph Abstract Data Types, Elementary Graph Operations.

HASHING: Introduction, Static Hashing, Dynamic Hashing.

PRIORITY QUEUES: Single and double ended Priority Queues, Leftist Trees.

Suggested Learning Resources:

Textbook:

Ellis Horowitz, Sartaj Sahni, and Susan Anderson-Freed, Fundamentals of Data Structures in C, 2nd Ed, Universities Press, 2023.

Reference Books:

1. Seymour Lipschutz, Data Structures Schaum's Outlines, McGraw-Hill, 2014.
2. Aaron M Tenenbaum, Data Structures using C, Pearson Education, 2019.
3. Reema Thareja, Data Structures Using C, 3rd Ed., Oxford Press, 2012.

Web links and Video Lectures (e-Resources):

1. Introduction to Data Structures:
<https://www.youtube.com/watch?v=zWg7U0OEAOE&list=PLBF3763AF2E1C572F&index=1>
2. Stacks: <https://www.youtube.com/watch?v=g1USSZVWDsY&list=PLBF3763AF2E1C572F&index=2>
3. Queues and Linked Lists:
<https://www.youtube.com/watch?v=PGWZUgzDMYI&list=PLBF3763AF2E1C572F&index=3>
4. Trees: <https://www.youtube.com/watch?v=tORLeHHtazM&list=PLBF3763AF2E1C572F&index=6>
5. Hashing: <https://www.youtube.com/watch?v=KW0UvOW0XIo&list=PLBF3763AF2E1C572F&index=5>
6. Infosys Springboard: Data Structures & Algorithms using C++, C and Python – 2026:
<https://infyspringboard.onwingspan.com/>
7. Virtual Labs: Computer Science and Engineering - Data Structures-1: <https://ds1-iiith.vlabs.ac.in/>

Course Outcome

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

- CO 1.** Recall the fundamental concepts, terminology, and characteristics of various data structures.
- CO 2.** Explain the principles, representation, and operations of linear and non-linear data structures.
- CO 3.** Implement different primitive data structures, their operations, and primitive applications.
- CO 4.** Choose a suitable data structure to solve computational and real-world problems.
- CO 5.** Make use of hashing techniques and leftist trees to organise the data effectively.

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Assessment Details (both CIE and SEE)

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester

End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the CIE, a student must score at least 40% of 50 marks, i.e., 20 marks.
- To pass the SEE, a student must score at least 35% of 50 marks, i.e., 18 marks.
- Notwithstanding the above, a student is considered to have passed the course, provided the combined total of CIE and SEE is at least 40 out of 100 marks.

Continuous Comprehensive Assessments (CCA) + Internal Assessment Test (IA) = Continuous Internal Evaluation CIE [25 + 25 = 50 marks]

A minimum of two Internal Assessment Tests (IA) shall be conducted, carrying a total of 25 marks.

In addition, Continuous Comprehensive Assessment (CCA) shall be conducted for a total of 25 marks.

It is recommended to include a maximum of two learning activities in the CCA to foster students' holistic development. These activities shall be:

Sl. No.	Name of the Learning activity	Maximum Marks
1.	Problem-Solving: Competitive Programming Assignments (HackerRank/HackerEarth/LeetCode)	15
2.	Problems with stack applications, trees, tree traversals, threaded binary trees, BST, graphs, and traversals, Hashing and Liftist trees.	10

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code:	IBCS305	TITLE: Data Structure and Applications										
List of Course Outcomes	Program Outcomes											Total
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	
CO-1	2	2	2			-	-		-	-	-	6
CO-2	2	2	3			-	-		-	-	-	7
CO-3	2	2	3			-	-		-	-	-	7
CO-4	2	2	2			-	-		-	-	-	6
CO-5	2	2	2			-	-				-	6
Total	9	10	12									35

The Correlation of Course Outcomes (CO's) and Program Specific Outcomes (PSO's)

Subject Code:	BCS304	TITLE: Data Structure and Applications	Faculty Name:	Mrs Hamsa A S
List of Course Outcomes	Program Specific Outcomes			Total
	PSO-1	PSO-2		
CO-1	2	-		2
CO-2	2	-		2
CO-3	2	-		2
CO-4	2	-		2
CO-5	2	-		2
Total	10	0		10

Note: 3 = Strong Contribution, 2 = Average Contribution, 1 = Weak Contribution, - = No Contribution



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