ADVANCED DATA STRUCTURES
(Professional Elective - 1)

	L	T	P	C
Subject Code: UGIT5T0218				
III Year / I Semester	3	0	0	3

Course Objective:

1. Students get thorough understanding of advanced data structure concepts like balanced search trees, hash tables, priority queues, text processing and file structures. This helps the students when approaching complex problem solving.

2. To ensure that the student evolves into a competent programmer capable of designing and analyzing implementations of complex data structures for different kinds of problems.

SYLLABUS:

UNIT I: **7 hrs.**

Priority Queues: Definition, Realizing a Priority Queue using Heaps, Definition, insertion, Deletion, Binomial Queues.

UNIT II: **8 hrs.**

Dictionaries: Dictionaries, linear list representation, skip list representation, hash table representation, hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing, comparison of hashing and skip lists.

UNIT III: **11 hrs.**

Search Trees (Part1): AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Splay Trees

UNIT IV: **12 hrs.**

Search trees (Part II): Introduction to Red –Black, B-Trees, B-Tree of order m, height of a B-Tree, insertion, deletion and searching, comparison of Search Trees

UNIT V: **5 hrs.**

Pattern matching and Tries: Pattern matching algorithms-Brute force, the Boyer – Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

UNIT VI: **5 hrs.**

File Structures: Sequential file organization-concept and primitive operations, Direct Access File-Concepts and Primitive operations, Indexed sequential file organization-concept, types of indices, structure of index sequential file

Course Outcomes

Upon the completion of the course, the students will be able to:

CO1. Design advanced data structure using non-linear data structures like advanced queues and balanced trees.

CO2. Analyze and implement operations like searching, insertion, and deletion, on various data structures like advanced queues, hashing, Dictionaries and Balanced trees.

CO3. Determine and analyze the complexity of given Algorithms developed for non linear advanced data structures and identify the data structure suitable for various applications.

CO4. Illustrate different types of Pattern matching algorithms and tries

CO5. Summarize the primitive operations on files, file organization and accessing the files.

Mapping of COs to Pos

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	-	3	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	3	-	-	-	-	-	-	-	-	-	-	-

Text Book:

1. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.
2. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and .Mount, Wiley student edition, John Wiley and Sons.
3. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second edition.

References:

1. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson
2. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
3. File Structures :An Object oriented approach with C++, 3rd ed, Michel J Folk, Greg Riccardi, Bill Zoellick