ADVANCED DATA STRUCTURES
(Professional Elective-I)

Course Code : 15CT1111

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Course Outcomes:

At the end of the course, a student will be able to

CO 1 Apply concepts of Heaps.

CO 2 Use Hash functions in indexing.

CO 3 Design applications using Red-Black and Splay trees.

CO 4 Explain Digital Search Structures.

CO 5 Apply various String Matching Techniques

UNIT-I **(10 Lectures)**

PRIORITY QUEUES:

Single and double ended Priority Queues, Leftist trees, Binomial Heaps, Fibonacci Heaps, Pairing Heaps.(Text book 1)

UNIT-II **(10Lectures)**

HASHING:

Hash Functions, Collision Resolution, Deletion, Perfect Hash Functions, Hash Functions for Extendible files. (Text book 2)

UNIT-III **(10Lectures)**

EFFICIENT BINARY SEARCH TREES:

Red-Black Trees: Definition, Representation of a Red-Black Tree, Searching, inserting into, deletion from a Red-Black tree.Splay trees: Bottom Up Splay trees, Top-Down Splay Trees.(Text book 1)

UNIT-IV **(10 Lectures)**

DIGITAL SEARCH STRUCTURES:

Digital search trees, Binary Tries and Patricia, Multiway Tries. (Text book 1)

UNIT-V (10 Lectures)

STRING MATCHING:

Exact String Matching-Straight forward Algorithms, The Knuth-Morris-Pratt Algorithm, The Boyer-Moore Algorithm, Multiple Searches, Bit-Oriented Approach. (Text book 2)

TEXTBOOKS:

1. Ellis Horowitz, Sartajsahni, Dinesh Mehta, *Fundamentals of Data structures in C++*, 2nd edition, University Press (India) Pvt.Ltd.
2. Adam Drozdek, *Data structures and algorithms in C++*, 3rd Edition, Cengage Learning. 2008

REFERENCES:

1. Langsam, Augenstein and Tanenbaum, *Data structures using C and C++*, 2nd Edition, PHI. 2009
2. W.Savitch, *Problem solving with C++, The Object of Programming*, 5thedition, Pearson education. 2004.
3. Mark Allen Weiss, *Data structures and Algorithm Analysis in C++*, 2nd Edition, Pearson Education. 2007