

**ST. ANN'S COLLEGE OF ENGINEERING & TECHNOLOGY, CHIRALA**  
**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**  
**LESSON PLAN**

**Subject: Advanced Data Structures**

**Academic Year: 2019 – 2020**

**Name: T.Y.Srinivasa Rao**

**Year & Sem/Section: II - II 'C'**

<b>Unit No.</b>	<b>Topics Planned to be Covered</b>	<b>No. of Periods Required</b>
<b>I</b>	<b>Sorting:</b> External Sorting, Introduction, K-way Merging - Buffer Handling for parallel Operation- Run Generation- Optimal Merging of Runs.	<b>8</b>
<b>II</b>	<b>Hashing:</b> Introduction-Static Hashing- Hash Table- Hash Functions- Secure Hash Function- Overflow Handling- Theoretical Evaluation of Overflow Techniques, Dynamic Hashing- Motivation for Dynamic Hashing - Dynamic Hashing Using Directories- Directory less Dynamic Hashing.	<b>11</b>
<b>III</b>	<b>Priority Queues (Heaps):</b> Heap Operations- Other Heap Operation, Applications of Priority Queues- The Selection Problem Event Simulation Problem, Binomial Queues- Binomial Queue Structure – Binomial Queue Operation- Implementation of Binomial Queues.	<b>11</b>
<b>IV</b>	<b>Efficient Binary Search Trees:</b> Optimal Binary Search Trees, AVL Trees, Red-Black Trees, Definition- Representation of a Red- Black Tree- Searching a Red-Black Tree- Inserting into a Red Black Tree- Deletion from a Red-Black Tree- Joining Red-Black Trees, Splitting a Red-Black tree.	<b>11</b>
<b>V</b>	<b>Multiway Search Trees:</b> M-Way Search Trees, Definition and Properties- Searching an M-Way Search Tree, B-Trees, Definition and Properties- Number of Elements in a B-tree- Insertion into B-Tree- Deletion from a B-Tree- B+-Tree Definition- Searching a B+-Tree- Insertion into B+-tree- Deletion from a B+-Tree.	<b>11</b>
<b>VI</b>	<b>Digital Search Structures:</b> Digital Search Trees, Definition- Search, Insert and Delete- Binary tries and Patricia, Binary Tries, Compressed Binary Tries- Patricia, Multiway Tries- Definitions- Searching a Trie- Sampling Strategies- Insertion into a Trie- Deletion from a Trie- Keys with Different Length- Height of a Trie- Space Required and Alternative Node Structure- Prefix Search and Applications- Compressed Tries- Compressed Tries With Skip Fields- Compressed Tries With Labeled Edges- Space Required by a Compressed Tries, Tries and Internet Packet Forwarding , - IP Routing- 1-Bit Tries- Fixed-Stride Tries-Variable-Stride Tries.	<b>9</b>
<b>Total Number of Periods Required</b>		<b>61</b>

**TEXT BOOKS**

1. Data Structures, A Pseudocode Approach, Richard F Gilberg, Behrouz A Forouzan, Cengage.
2. Fundamentals of Data Structures in C++, Ellis Horowitz, Sartaj Sahni and Dinesh Mehta, 2nd Edition, Universities Press (India) Pvt. Ltd.
3. Data structures and Algorithm Analysis in C++, 2<sup>nd</sup> edition, Mark Allen Weiss, Pearson.

**REFERENCE BOOKS**

1. <http://lcm.csa.iisc.ernet.in/dsa/dsa.html>
2. [http://utubersity.com/?page\\_id=878](http://utubersity.com/?page_id=878)
3. <http://freevideolectures.com/Course/2519/C-Programming-and-Data-Structures>
4. <http://freevideolectures.com/Course/2279/Data-Structures-And-Algorithms>
5. File Structures: An Object oriented approach with C++, 3<sup>rd</sup> ed., Michel J Folk, Greg Riccardi, Bill Zoellick.
6. C and Data Structures: A Snap Shot oriented Treatise with Live examples from Science and Engineering, N B Venkateswarlu & E V Prasad, S Chand, 2010.

**FACULTY**

**HEAD OF THE DEPARTMENT**