SEMESTER-III

Title of the Paper: Data Structure Using C++		
Credit: 4 **Course Outcome:**	At the end of this course, the successful students will be able to: • Use computer memory effectively. • Access data efficiently. • Understand Object Oriented Programming Concepts.	**Theory**
Unit –I		
OOPs concept, Procedural vs OOP programming, OOP terminology and features, Tokens, Character set, Keywords, Data-types, Data Types declarations, Constants and variables, expressions, Standard Library and header files, Classes and Objects,		
Unit –II		
Operator and Expressions: Arithmetic Operator, Increment/Decrement Operator, Relational Operator, Logical Operator and conditional operators, While, Do-while, For statements nested loops. If-else, switch, break, continue and Go to statements, Classes and Objects: Need for Classes, Declaration of Classes.		
Unit –III		
Data Structure definition and its classification, objective to study data structure, Algorithms and their complexity related issues, Stack definition, application and Implementation, Queue definition, application and Implementation, Doubly Ended queue, Circular Queue, Linked list, Single Linked list and Doubly Linked List, Disadvantages of Queue and Stacks, Advantages of Linked list over Queue and Stacks.		
Unit –IV		
Searching, linear and non-linear searching, Binary searching, sorting, Internal Sorting Vs External Sorting, Insertion sort, selection sort, bubble sort, Hashing and Collision Resolution techniques, Graph, Basic Terminology, Graph Traversal, Minimal Spanning Tree, Binary Trees, AVL tree.		

Referenced Books:

[1] Bjarne Stroustrup, "A Tour of C++", C++ in Depth Series.

[2] E. Balagurusamy, "Object Oriented Programming with C++", Mcgraw Hill publication.

Suggested Readings:

[1] Barbara Johnston, "C++ Programming Today", Pearson Education.

[2] R B Patel, "Expert Data Structure with C", Khanna Publication, Fourth Edition.

Weblinks:

[1] http://heecontent.upsdc.gov.in/.

[2] https://www-personal.acfr.usyd.edu.au/tbailey/ctext/ctext.pdf.

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Title of the Paper: Data Structure Using C++, Python		
Credit: 4 **Course Outcome:**	At the end of this course, the successful students will be able to: • Learn Data organization. • Know data sorting and access techniques • Write programs in Python	**Practical**

List of Exercise based on Data Structure using C++, Python:

Data Structure using C++:

1. Implementation of dynamic memory allocation
2. Implementation of single dimensional and multidimensional arrays
3. Structure implementation
4. Stack Implementation with all operations
5. Stack Implementation as abstract data type
6. Stack application for In-fix, Post-fix and Pre-fix polish expression.
7. Implementation of Recursion
8. Queue Implementation with insertion and deletions of elements.
9. De-queue Implementation
10. Circular Queue Implementation
11. Priority Queue Implementation
12. Single linked Creation with all kind of operations in all conditions
13. Implementation of pointers
14. Stack Implementation using linked list
15. Queue Implementation using Linked list
16. Doubly Linked list creation with all kind of operations in all possible conditions.
17. Circular Linked list creation with all kind of operations in all possible conditions.
18. Creation of tree and performing insertion and deletion of nodes.
19. Creation of Binary tree.
20. Traversal of Binary tree (In Order, Pre Order, Post Order)
21. Implementation of sequential search.

Python:

1. Implementation of Standard input and output statement
2. Implementation of variables and operators
3. Implementation of conditional and decision making statement
4. Implementation of control and looping structure
5. Implementation of strings and text

Referenced Books:

[1] E. Balagurusamy, "Object Oriented Programming with C++", Mcgraw Hill publication.

[2] Jason Rees, "Python Programming: A Practical Introduction To Python Programming For Total Beginners", McGraw Hill.

Suggested Readings:

[1] Barbara Johnston, "C++ Programming Today", Pearson Education.

[2] R B Patel, "Expert Data Structure with C", Khanna Publication, Fourth Edition.

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