

| Course Type | Course Code | Name of Course | L | T | P | Credit |
|-------------|-------------|---------------------------|---|---|---|--------|
| DP | NMCC519 | Data Structures-Practical | 0 | 0 | 3 | 1.5 |

| Course Objective |
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| <ul style="list-style-type: none"> To make students to have the hands on experience/knowledge of implementing different types Data Structures. |
| Learning Outcomes |
| <ul style="list-style-type: none"> Upon successful completion of this course, students will become a good programmer to implement different Data Structures and their related Algorithms. |

| Unit No. | Topics to be Covered | Contact Hours | Learning Outcome |
|--------------|---|---------------|---|
| 1 | Basic concepts; Mathematical Background; Arrays: one dimensional, multi-dimensional, Sparse Matrix. Searching: Linear and Binary search; Hashing: hash tables, hash functions, open addressing Stacks: Representation, elementary operations and applications such as infix to postfix, postfix evaluation, parenthesis matching. Queues: Simple queues, circular queue, elementary operations and applications | 12 | This unit will help students to learn the implementation of various Data Structures like: Arrays, Sparse Matrix, Stacks, Queues and their related operations. |
| 2 | Linked lists: Linear, circular and doubly linked lists, elementary operations and applications such as polynomial manipulation. Trees: Basic definitions, Binary tree representation, tree traversal, binary search tree, height balanced trees like AVL tree and 2 tree, heap, complete binary tree, other operations and applications of trees. | 12 | This unit will make students learn the implementation of Link list, Trees and their applications. |
| 3 | Graphs: Basic definitions, Representation, Adjacency list, graph traversal, path matrix, connected components, DAG, topological sort, Spanning tree, Shortest path algorithms: Single pair and All pair shortest path algorithms. | 08 | This unit will make students learn the implementation of Graph and its related algorithms. |
| 4 | Sorting Algorithms: Selection sort, bubble sort, quick sort, merge sort, heap sort, radix sort | 04 | This unit will make students to learn about the implementation of sorting. |
| Total | | 42 | |

Text Book:

1. S. Lipschuts, Data Structures with C, Schaum's Outline Series, 2017.

Reference Books:

1. Y. Langsam, M.J. Augenstein and A.M. Tenenbaum, Data Structures Using C and C++, PHI, 2007
2. E. Horowitz and S. Sahni, Fundamentals of Data Structures, University Press, 2008