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Course Code	3MCA102
Course Title	**Data Structures**

Course Outcomes (COs):

At the end of the course, students will be able to -
1. illustrate the fundamental concepts of data structures
2. analyse various data structures and their applicability
3. comprehend and implement various techniques for searching and sorting
4. identify the appropriate data structures to design efficient algorithm for the given application

Syllabus:

Teaching hours:

Unit I 06
Introduction to Data Structures: Basic Terminology, Elementary Data Structure Organization, Classification of Data Structures: Primitive and Non-primitive, Linear and Non-linear, Operations on Data structures, Asymptotic notations, Notion of recursive algorithms.

Unit II 12
Linear Data Structures: Introduction, variations, operations and applications of array, queue, stack and linked list.

Unit III 12
Non Linear Data Structures: Concepts and types of trees, tree traversal algorithms, search trees, Priority queue implementation and applications, Representations of Graphs, Graph traversal algorithms.

Unit IV 07
Indexing structure: Concepts and implementations of B-Tree, B+-tree, Hashing, Dictionary.

Unit V 08
Searching and sorting algorithms: Linear Search, Binary search, Internal and external sorting algorithms, sorting without comparison.

Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Laboratory Work:

Laboratory work will be based on above syllabus with minimum 8 experiments to be incorporated that will be considered for evaluation.

Suggested Readings^:

1. Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with Applications, Tata McGraw Hill.
2. Tanenbaum, Data Structures using C & C++, PHI.
3. Robert L. Kruse, Data Structures and Program Design in C, PHI.
4. Mary E.S. Loomis, Data Management and file processing, PHI.

L=Lecture, T=Tutorial, P=Practical, C=Credit

^this is not an exhaustive list