

COURSE TITLE : **FOUNDATIONS OF COMPUTER SOFTWARE**
COURSE CODE : **3261**
COURSE CATEGORY : **B**
PERIODS/WEEK : **4**
PERIODS/SEMESTER : **60**
CREDITS : **4**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Introduction to Data Structures	15
2	Searching, Sorting, Tree and Graph	15
3	Basics of System Software and Operating Systems	15
4	Memory management, I/O Systems, File System	15

Course General Outcomes:

Sl.	G.O	On completion of this course the student will be able to :
1	1	Understand the concepts of data structures
	2	Discuss linear data structures
2	1	Analyze standard algorithms for searching and sorting.
	2	Understand the non-linear data structures
3	1	Discuss different system software.
	2	Discuss about operating systems
	3	Discuss process management concepts
4	1	Understand the concepts of memory management.
	2	Discuss file-system I/O system concepts

Specific Outcomes:

MODULE – I: Introduction to Data Structures

1.1 Understand the concepts of data structures

- 1.1.1 Define Data Structures
- 1.1.2 Explain basic data structures

1.1.3 Recall the concept of Arrays

1.2 Discuss linear data structures

1.1.1 Discuss stacks and its operations.

1.1.2 Describe Queue and its operations.

1.1.3 Explain a circular queue

1.1.4 Describe a priority queue

1.1.5 Explain about de-queue

1.1.6 Define a linked list.

1.1.7 Discuss the Linked List operations- Insertion, deletion and searching.

MODULE – II: Searching, Sorting, Tree and Graph

2.1 Analyze standard algorithms for searching and sorting.

2.1.1 Differentiate between various searching methods.

2.1.2 Explain linear search.

2.1.3 Illustrate binary search.

2.1.4 Define Sorting.

2.1.5 Explain Selection sort.

2.1.6 Describe bubble sort.

2.1.7 Discuss insertion sort.

2.1.8 Explain quick sort

2.1.9 Describe merge sort

2.1.10 Differentiate between the sorting methods Bubble Sort, Selection Sort and Insert Sort

2.2 To understand the non-linear data structures

2.2.1 Define Tree and Binary tree.

2.2.2 Differentiate between the various tree traversal methods

2.2.3 Define Graph

2.2.4 Explain Depth First searching in Graph

2.2.5 Explain Breadth first searching in Graph

MODULE – III: Basics of System Software and Operating Systems

3.1 Discuss different system software

3.1.1 Define Software

3.1.2 Differentiate between Application software and System Software

3.1.3 Compare various system software.

3.1.4 Discuss fundamentals of system software.

3.1.5 Explain about language translator.

3.2 Discuss about operating systems

- 3.2.1 Define Operating System
- 3.2.2 Recognize usage of operating systems.
- 3.2.3 List different types of operating systems.
- 3.2.4 Explain batch processing system.
- 3.2.5 Discuss multi programmed system.
- 3.2.6 Describe a time sharing system.

3.3 Discuss process management concepts

- 3.3.1 Define Process
- 3.3.2 Explain the process states
- 3.3.3 Define Process Control Block.
- 3.3.4 Discuss process scheduling algorithms- FCFS, SJF, Round Robin, Priority Scheduling.

MODULE – IV: Memory management, I/O Systems, File System

4.1 Understand the concepts of memory management

- 4.1.1 Discuss the need for memory management
- 4.1.2 Explain dynamic loading.
- 4.1.3 Describe swapping.
- 4.1.4 Discuss the concept and need of paging
- 4.1.5 Describe segmentation.
- 4.1.6 Explain virtual memory concept.
- 4.1.7 Compare the various page replacement algorithms.

4.2 Discuss File System and I/O system concepts

- 4.1.1 Explain the file concept
- 4.1.2 Discuss the File Access methods
- 4.1.3 Compare the various Directory Structures.

CONTENT DETAILS

MODULE – I: Introduction to Data Structures

Data Structures: - Study of basic data structures – Arrays – Stacks – Queues-Circular queues- Priority queues – Dqueues, Linked lists; Implementation of fundamental operations using data structures- insertion, deletion, searching.

MODULE – II: Searching, Sorting, Tree and Graph

Searching & Sorting- linear search, binary search; Selection sort, Insertion sort, Bubble sort, Merge sort, Quick sort, Comparison of different sorting methods(based on applications);

Trees & Graphs – Trees - Binary Trees – Tree Traversal – In order – Pre order and Post order.

Graphs: – Depth first and breadth first search.

MODULE – III: Basics of System Software and Operating Systems

System Software: Basic software systems classification- application software, system software, utilities; fundamentals of system software-operating systems, language translators;

Operating Systems: Operating system overview, types – batch processing, multi-programmed, time-sharing;

Process management: process concepts, process states, PCB, process scheduling algorithms - FCFS, SJF, Round Robin, Priority Scheduling.

MODULE – IV: Memory management, I/O Systems, File System

Memory management:Dynamic loading, swapping, Paging- basics, Segmentation, Virtual memory-page replacement algorithms; **I/O systems-** basics, **File-System-** File Concept, Access Methods, Directory Structure.

TEXT BOOK(S)

1. Reema Thereja, *Data Structures Using C*, 2nd Edition, Oxford University Press
2. Seymour Lipschutz, *Data Structures with C*, Schaum's Outlines, McGraw Hill , New Delhi, 2010
3. Abraham Silberschatz, Peter B.Galvin and Greg Gagne, "*Operating System Concepts*", John Wiley & Sons Inc, 8th Edition 2010.

REFERENCE

1. R Krishnamoorthy& G IndiraniKumaravel, *Data Structures using C*, McGraw Hill , New Delhi, 2008
2. Brijendra Kumar Joshi, *Data Structures and Algorithms in C*, McGraw Hill , New Delhi, 2010
3. Achyut S Godbole, "*Operating Systems*", Tata McGraw Hill , New Delhi, 2nd Edition, 2009.
4. D M Dhamdhere, "*Operating Systems A Concept-based Approach*", Tata McGraw Hill, New Delhi, 2nd Edition, 2010.
5. V Raghavan, "*Principles of Compiler Design*", Tata McGraw Hill, India, 2010