Data Structures & Algorithms – Progressive Assessment Syllabus

This program is designed to build **strong problem-solving skills** through a **3-level assessment model** — **Easy, Medium, and Hard** — aligned with real interview and placement standards.

Assessment Structure

- **Easy** → Concept clarity & basic logic
- **Medium** → Pattern recognition & optimized thinking
- **Hard** → Advanced logic, constraints, and interview-level problems

Each day focuses on **one core topic**, gradually increasing in complexity.

Complete Topic-Wise Syllabus

1. Syntax & Coding Fluency

Focus Areas

- Output prediction
- Conditional statements
- Loop execution & iteration tracing
- Operator precedence
- Debugging using dry-run

Assessment Level: Easy

2. Must-Know Algorithms

Focus Areas

- Factorial logic (iterative & recursive)
- Fibonacci series
- Prime number checking
- Palindrome numbers
- Armstrong numbers
- GCD & LCM logic

Assessment Level: Easy → Medium

3. Arrays

Focus Areas

- Array traversal techniques
- Finding maximum & minimum
- Reversing arrays
- Prefix sum technique
- Array rotation

- 2D array traversal

Assessment Level: Easy → Medium

4. String Processing

Focus Areas

- Palindrome checking
- Character frequency counting
- Anagram validation
- Substring logic
- String compression techniques

Assessment Level: Easy → Medium

5. Algorithm Building Techniques

Focus Areas

- Merge logic
- Frequency mapping
- Sliding window technique
- Subarray sum problems

Assessment Level: Medium

6. Recursion

Focus Areas

- Recursive function structure
- Base case & recursive case
- Factorial using recursion
- Fibonacci using recursion

Assessment Level: Easy

7. Linked List

Focus Areas

- Node creation & traversal
- Reverse linked list
- Finding middle node
- Merging two linked lists
- Intersection point of linked lists

Assessment Level: Easy → Medium

8. Stack

Focus Areas

- Stack implementation
- Push & pop operations
- Expression evaluation (infix/postfix basics)

Assessment Level: Medium

9. Queue

Focus Areas

- Linear queue
- Circular queue implementation

Assessment Level: Medium

10. Priority Queue / Heap

Focus Areas

- Min heap & max heap
- Heap insertion & deletion
- Kth largest / smallest element

Assessment Level: Hard

11. HashMap

Focus Areas

- Frequency counting
- Prefix sum logic
- Optimized lookups

Assessment Level: Hard

12. Searching

Focus Areas

- Linear search
- Binary search
- Counting occurrences in sorted arrays

Assessment Level: Easy

13. Sorting

Focus Areas

- Bubble sort

- Selection sort
- Merge sort
- Step-by-step dry run & complexity understanding

Assessment Level: Medium

14. Tree & Graph (Introduction)

Focus Areas

- Tree traversal basics
- Graph traversal using BFS & DFS
- Queue-based traversal logic

Assessment Level: Hard