

WORK PLAN (Odd Semester: August – November 2026)

Paper Name: Algorithms and Advanced Data Structures

Course: B.Sc. (Hons.) Computer Science – V Semester (NEP UGCF 2022)

Teacher Name: Mr. Rajeev Kumar Rai

S. No.	Month	Content
1	August 2026	• Unit 4 – Randomization: Randomized Quicksort, Randomized Select, Skip Lists (6 hrs) • Lab Practice: Randomized Quick Sort (with comparison count), Randomized Select • Class Test 1
2	September 2026	• Unit 2 – String Matching: Brute Force, KMP Algorithm • Unit 2 – Tries: Standard Tries, Compressed Tries, Suffix Tries, Search Engines • Unit 2 – Network Flows: Ford–Fulkerson Algorithm for the Max-Flow Problem (13 hrs in all) • Lab Practice: Pattern searching using the KMP algorithm, Suffix Trie (brute-force method) • Revision • Assignment 1 • Class Test 2
3	October 2026	• Unit 3 – More on Trees: B-Trees, 2-4 Trees • Unit 3 – More on Graphs: Bellman–Ford Algorithm, Union–Find Data Structures and Their Application in Kruskal’s Algorithm (16 hrs in all) • Lab Practice: B-Tree implementation, Bellman–Ford shortest paths, Minimum Spanning Tree using Kruskal’s algorithm • Assignment 2 • Class Test 3
4	November 2026	• Unit 1 – Advanced Analysis of Algorithms: Amortized Analysis – Aggregate Method, Accounting Method • Unit 1 – Intractability: Polynomial-time Reductions, Efficient Certification and the Class NP, NP-Complete Problems (10 hrs in all) • Revision • Lab Practice • Class Test 4

Note:

Lab exercises, assignments, and class tests will be conducted in alignment with the listed topics throughout the semester.

The plan covers 45 hours of theory and 30 hours of practical work as prescribed in the syllabus, and follows the unit-wise contents and reference readings of the revised NEP UGCF 2022 guidelines.