

Report on the Five-Day Faculty Development Programme

Data Structures and Algorithms: Through the Lens of Complexity and Applications

Duration: 22nd June 2026 – 26th June 2026

The Department of Computer Science and Engineering organized a five-day Faculty Development Programme (FDP) on "**Data Structures and Algorithms: Through the Lens of Complexity and Applications**" from **22nd June 2026 to 26th June 2026** for the benefit of faculty members. The programme was conducted by **Dr. Venkatesh Raman, Honorary Professor, IIT Palakkad** and **Dr. Krithika Ramasamy, Associate Professor, IIT Palakkad**. The FDP aimed to strengthen the participants' understanding of algorithmic thinking, data structures, computational complexity, and their practical applications.

Day 1 – Foundations of Algorithms and Data Structures

The programme commenced with **Session 1 & 2: "Algorithms – What and Why?"**, where Dr. Venkatesh Raman introduced the fundamentals of algorithms, their significance in problem solving, and methods for analyzing algorithm efficiency. The concept of binary search was used to demonstrate time complexity and algorithm analysis.

Session 3: "Introduction to Data Structures" covered the fundamentals of arrays, linked lists, stacks, and queues. The resource person discussed their implementation, characteristics, and real-world applications.

Day 2 – Advanced Data Structures and Algorithmic Concepts

Sessions 4 & 5: "Continuation of Data Structures" focused on binary search trees and heaps. The sessions explained tree traversal, heap operations, and the importance of these structures in efficient data organization.

Session 6: "Introduction to Algorithms, Sorting and Graphs" introduced various sorting techniques and graph representations, emphasizing their applications in solving computational problems efficiently.

Day 3 – Algorithm Design Techniques

Session 7: "Divide and Conquer" presented the divide-and-conquer paradigm through classical algorithmic examples, highlighting recursive problem-solving strategies.

Session 8: "Graph Algorithms – BFS and DFS" explained graph traversal techniques, their implementation, and applications in network analysis and pathfinding.

Session 9: "Dynamic Programming and Greedy Algorithms" introduced optimization techniques, comparing dynamic programming and greedy strategies with suitable examples and complexity analysis.

Day 4 – Computational Complexity

Sessions 10 & 11: "NP-Completeness and Beyond" focused on computational complexity, polynomial-time solvability, NP-complete problems, and the theoretical limits of algorithmic computation. The discussions enhanced participants' understanding of problem classification and complexity theory.

Day 5 – Interactive Discussions and Programme Wrap-up

The final day was dedicated to interactive discussions, problem-solving exercises, clarification of participant queries, and a comprehensive review of the concepts covered throughout the programme. Faculty members actively participated in discussions on algorithm design, complexity analysis, and teaching methodologies. The programme

concluded with valuable insights into integrating advanced algorithmic concepts into classroom teaching and research activities.

Overall, the FDP provided an enriching learning experience by offering a comprehensive understanding of data structures, algorithms, and computational complexity. The sessions were highly informative and interactive, enabling faculty members to enhance their subject knowledge and pedagogical skills for delivering high-quality computer science education.



