Knowledge Network of
Indian Institute of Technology Gandhinagar
Under TEQIP-II Initiative

<u>Summer School on Design and Analysis of Algorithms</u>

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The summer course on "Algorithmic Fundamentals Unplugged" is about examining the foundations of algorithm analysis and design, from the perspective of examples, activities and implementations. The course involves approximately 40 hours of instruction in the form of lectures, and 30 hours of interactive activities including problem solving, implementing and visualizing algorithms, and even games that serve to demonstrate the main conceptual ideas. The focus will be on proofs and formal reasoning about algorithms, in the contexts of correctness and efficiency. It is in this sense that the course is called Algorithmic Fundamentals Unplugged--- our focus is on the ideas and concepts, rather than a particular programming language or choice of hardware.

This summer school provides an opportunity for the faculty members and students to revisit the important fundamental concepts. Participation in this summer school is invited through registration.

Topics to be covered
Basics of algorithm analysis: asymptotics, big-oh notation, etc; Algorithmic paradigms: Divide and Conquer, Branch and Bound, Greedy, Dynamic Programming; Specific algorithmic problems: Sorting, Shortest Paths in Graphs, Graph Traversals, Network Flows, Stable Matchings, Coloring, Spanning Trees, Fast Fourier Transforms, String Matching Algorithms, Number Theoretic Algorithms, etc; Introductory Computational Complexity: P, NP, NP-completeness; Dealing with NP-completeness, beyond polynomial time exact algorithms: approximation, local search, heuristics, exact exponential algorithms, randomized algorithms.

The following format will be followed in the summer school:
The day comprises of 3 hrs of Instruction +2 hrs of hands-on activities +1 hr of code

Presenters: Instructors:
1. Prof. Bireswar Das (IIT Gandhinagar)
2. Prof. Manoj Gupta (IIT Gandhinagar)
3. Prof. Neeldhara Misra (IIT Gandhinagar)