COMPUTATIONAL GEOMETRY

PROF. AMIT KUMAR
Department of Computer Science and Engineering
IIT Delhi

TYPE OF COURSE: Rerun | Elective | UG
COURSE DURATION: 12 weeks (18 Jan' 21 - 09 Apr’ 21)
EXAM DATE: 24 Apr 2021

PRE-REQUISITES: Data Structures and Algorithms
INTENDED AUDIENCE: 4th year undergraduate or beginning graduate students

COURSE OUTLINE:

ABOUT INSTRUCTOR:
Amit Kumar is Tarwinder and Jaswinder Chadha Chair Professor in the Dept. of Computer Science and Engineering at IIT Delhi. He obtained B.Tech. degree from IIT Kanpur in 1997 and Ph.D. from Cornell University in 2002. He works in the area of combinatorial optimization, with emphasis on problems arising in scheduling, graph theory and clustering. He received IBM Faculty Award in 2005, INAE (Indian National Academy of Engineering) Young Engineer Award in 2006 and INSA (Indian National Science Academy) Medal for Young Scientists in 2011. He was a Max Planck-India partner group research fellow during 2005-09. He received the prestigious Shanti Swarup Bhatnagar Award for Mathematical Sciences in 2018, and was elected Fellow of Indian Academy of Sciences in 2019.

COURSE PLAN:
Week 1: Introduction and Basic Problems
Week 2: Plane Sweep Technique
Week 3: Convex Hull and Algorithm
Week 4: Duality Transform and Application
Week 5: Lower Bound Techniques
Week 6: Point Location and Triangulation
Week 7: Voronoi Diagram and Delaunay Triangulation
Week 8: Arrangements and Levels
Week 9: Range Search
Week 10: Clustering Point sets using Quadtrees and Applications
Week 11: Epsilon-nets and VC Dimension
Week 12: Shape Analysis