

Introduction to Computer Science 2

Syllabus 2018 Spring

1. Basic enumeration, binomial coefficients, binomial theorem, Pascal's triangle.
2. Topics in graph theory: Basic definitions, connectedness, trees, spanning trees.
3. Planar graphs, Euler's theorem, Kuratowski's theorem, duality.
4. Euler trails and circuits, Hamilton paths and cycles.
5. Colorings of graphs: vertex coloring, bounds on the chromatic number, Mycielski's construction. Interval graphs.
6. Matchings. Theorems of König, Hall and Tutte. Gallai's theorems. Edge-chromatic number.
7. Flows in networks. Max flow-mincut theorem. Edmonds-Karp theorem.
8. Menger's theorems. Higher connectivity of graphs.
9. BFS, Kruskal's algorithm.
10. Shortest paths: Dijkstra's, Ford's and Floyd's algorithms.
11. DFS, DAG, longest paths in DAGs.