

Brooklyn College
Department of Computer & Information Sciences

CISC 7210 [*714.1X] Graph and Network Algorithms

37½ hours, plus conference and independent work; 3 credits

Data structures to represent graphs. Graph traversal algorithms. Network algorithms. Algorithms for constructing minimum spanning trees, shortest paths, maximum flows, and Euler and Hamilton paths. Vertex and edge coloring algorithms. Computationally hard problems, NP-completeness, and approximation algorithms.

Course Outline:

Week 1: Introduction and review of graphs and their representations.

Week 2: Review of graph traversals DFS, BFS and minimum spanning trees.

Week 3: Single source shortest paths.

Week 4: All to all shortest path.

Week 5: Maximum flow.

Week 6: Euler and hamiltonian tours.

Week 7: Midterm.

Week 8: Planar graphs

Week 9: Interval graphs

Week 10: Perfect graphs, matching.

Week 11: Vertex coloring

Week 12: Edge coloring.

Week 13: NP-complete graph problems.

Week 14: Approximation algorithms for graph problems.

Bibliography and References:

- T. H. Cormen, C.E. Leiserson, R.L. Rivest, C. Stein; Introduction to Algorithms, second edition, MIT Press, Cambridge, Massachusetts, 2001.
- Even, S.; Graph Algorithms, Computer Science Press, USA, 1979.
- Gibbons, A.; Algorithmic Graph Theory, Cambridge University Press, Cambridge, UK, 1985.
- Robert Sedgwick; Algorithms in C: Part 5 Graph Algorithms 3RD Addison Wesley 2001