CS810 ALGORITHMIC GRAPH THEORY 3-0-0-3

Graph clustering: Algorithms for partitioning a graph into well-connected pieces (e.g. spectral partitioning, sparsest-cuts, multi-way cuts, and so on).
Distances in graphs: Algorithmic methods for geometric problems in graphs, such as the Traveling Salesperson Problem, Minimum Spanning Trees, shortest paths, and so on.
Flows in graphs: Min-cut/max-flow duality, and its extensions to multi-commodity flows. Applications to divide & conquer.
Graph compression: Methods for representing succinctly large graphs (e.g. spectral sparsifiers, vertex sparsifiers, graph spanners, and so on).
Algorithmic graph-minor theory: Dynamic programming on graphs via tree decompositions. Algorithms for graphs on surfaces.

TEXTBOOKS/ REFERENCES:

1. R. Ahuja, L. Magnanti, and J. Orlin, Network Flows: Theory, Algorithms, and Applications.
2. Mohar, Bojan, and Carsten Thomassen. Graphs on surfaces. Vol. 2. Baltimore: Johns Hopkins University
Press, 2001.
3. T. H. Cormen, C. E. Leiserson, R. L. Rivest and C. Stein, Introduction to Algorithms.
4. Dougles West, “Introduction to Graph Theory”, Second Edition, PHI Learning Private Limited,2011.