

Advanced Topics in Combinatorics

This is a sequence focus on Combinatorial Optimization. This course usually follows with a second semester in the spring.

It is aimed at advanced students in discrete mathematics and discrete optimization. In the first semester, it will cover basics in discrete optimizations such as linear programming, network flow models including optimal spanning trees, shortest paths, maximum flows, minimum cost flows, and optimal matchings. The second semester will be more closer to research front problems. Usually the topics will discrete optimization problems in discrete math and in matroids. It varies with students interest. Past lectures and discussions were on problems related to matching polytopes, cycling and flowing matroids, distributed maximum flow algorithms, algorithmic aspect of uniformly dense matroids and hypergraphs, among others.

This sequence of courses can be used to fulfill PhD course requirement in either major (Discrete Math) or minor areas. Background should include either Math 541 or 543, and either Math 571 or 573.