

MATH 523 Combinatorial Optimization 2017 fall

Instructor: Jozsef Solymosi,  
Office: MATH 220,  
solymosi@math.ubc.ca

Grading: Homework assignments 40%, Take home midterm 20%, take home final 40%.

TueThu: 14:00 AM to 15:30 PM in MATX-1118

(Let me know if you refer a different schedule)

Office hours: TBA

Topics:

• **Shortest paths and trees**

- Shortest paths with nonnegative lengths
- Dijkstra's algorithm
- Minimum spanning trees
- Traveling salesman's problem

• **Polytopes, polyhedra, Farkas' lemma, and linear programming**

- Convex sets
- Polytopes and polyhedra
- Farkas' lemma
- Linear programming

• **Matchings and covers in bipartite graphs**

- Matchings and covers
- Augmenting paths
- Koenig's theorems

• **Menger's theorem, flows, and circulations**

- Menger's theorem
- Flows in networks
- Finding a maximum flow

• **Semidefinite Programming** (selected topics)

**Notes:**

- "*Understanding and Using Linear Programming*" and "*Approximation Algorithms and Semidefinite Programming*" by J. Matousek and B. Gartner, Springer. UBC library eBooks
- A. Schrijver, "*A Course in Combinatorial Optimization*" [Schrijver](#)
- L. Lovasz, "*Semidefinite optimization*" [Lovasz](#)

**Further readings:**

- [Beating Christofides](#) by Sitters and Stougie