MATH 523 Combinatorial Optimization 2016 spring

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

TueThu: 11:00 AM to 12:30 PM in MATX-1102

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"* http://homepages.cwi.nl/~lex/files/dict.pdf
- L. Lovász, *"Semidefinite optimization"* http://www.cs.elte.hu/~lovasz/notes.html