CMPUT 675, Winter 2005: Approximation Algorithms

We will study approximation algorithms for NP-hard optimization problems. You are expected to have good understanding of NP-completeness and basic complexity classes (equivalent of our CMPUT304 undergraduate course), basic notions in graph theory, and strong mathematical background.

Course webpage: `http://www.cs.ualberta.ca/~mreza/courses/CMPUT675`

All announcements for this course will be posted on this webpage.

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Tentative syllabus:

- Preliminaries, basic definitions, Vertex Cover
- Set Cover (Greedy algorithm, IP/LP-formulation and duality, Randomized Rounding, Primal-dual)
- Knapsack, Bin packing
- Randomized Rounding: MAX-SAT, Disjoint paths
- PTAS for Euclidean TSP
- Steiner trees and TSP: MST-based algorithms, Packing Steiner trees
- Facility location
- Multiway cut and k-cut
- Hardness results

Topics may be covered in some other order, may be skipped, or new topics may be added.

Grading Scheme:

There will be 3 assignment sets. Also, each participant in the course is required to provide scribe notes for one or two weeks of lectures. Scribe notes for each week are due the next Monday at noon. You will be provided with a LaTeX template.

Text book: Approximation Algorithms, by Vijay Vazirani, Springer-Verlag, Berlin, 2001. You don't have to have the textbook since the lecture notes will be available online, but it is a great book and can be very helpful.

Other sources: See the course webpage for more notes and other sources.