CMPT 881 - G100 Special Topics in Theoretical Computing Science

Instructors: Igor Shinkar

SFU Burnaby

Calendar Objective/Description:
None

Instructor's Objectives:
This is a graduate-level course in approximation and randomized algorithms. Many discrete optimization problems arising in theory and practice turn out to be NP-hard, and thus optimal solutions cannot be computed efficiently unless \( P = NP \). One approach to deal with this situation is to design approximation algorithms, i.e., efficient algorithms that are guaranteed to return a near-optimal solution. Randomized algorithms are another powerful and widely used approach to tackle problems for which efficient deterministic algorithms are not known. The objective of this course is to expose students to techniques in approximation and randomized algorithms.

Prerequisites:
None

Topics:
- Approximation Algorithms
- Greedy Algorithms
- Linear Programming
- Semidefinite Programming
- Randomized Algorithms
- Linearity Of Expectation
- Probabilistic Method
- Sublinear Time Algorithms
- Hardness of Approximation

Grading:
There will be 3-4 homework assignments and a project/presentation in the end of the course. The details to be discussed in the first week of the class.

Reference Books:
The Design of Approximation Algorithms, David P. Williamson and David B. Shmoys, Cambridge University Press, 9780521195270
Randomized Algorithms, Rajeev Motwani and Prabhakar Raghavan, 9780521474658

Academic Honesty Statement:
Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (http://www.sfu.ca/policies/gazette/student.html).