Course Information — Spring 2017

Course Staff	Room	Email id	Office Hours
Prof. Sofya Raskhodnikova	IST 343F	sxr48	T 1:30-2:30pm

Lectures TR 12:05-1:20pm, 341 Deike

Webpage `http://www.cse.psu.edu/~sofya/cse597AA/`
Check it for the record of what we covered, handouts, homework assignments, reading, etc.

Canvas: `http://www.canvas.psu.edu` We will use it for collecting HW, posting solutions and grades. **Forward announcements to your usual inbox.**

Questions and class discussion on Piazza: `https://piazza.com/psu/spring2017/cse597`. Rather than emailing questions to me, please post them on Piazza. Students who ask the largest number of good questions or give the largest number of helpful answers will get **bonus points** at the end of the course. There is an option to ask questions anonymously or only make it visible to instructors. Do not share your insights into homework problems when you ask public questions. However, make all nonsensitive questions public, so that others can benefit from the answers. **Forward announcements to your usual inbox.**

Textbook David P. Williamson and David B. Shmoys, *The Design of Approximation Algorithms*, Cambridge University Press, New York, NY, USA, 2011.
Additional (not required) book is:
Approximation Algorithms, by Vijay V. Vazirani, Springer-Verlag, Berlin, 2001.
A useful (not required) references for background material are:
Cormen, Leiserson, Rivest and Stein, *Introduction to Algorithms*, MIT Press.
Jon Kleinberg and Éva Tardos, *Algorithm Design*, Addison-Wesley, 2005.

Syllabus This course will cover the design and analysis of approximation algorithms for discrete optimization problems. Many problems in computer science and operations research can be modeled as discrete optimization problems, including packing, scheduling, facility location, internet routing, advertising, and network design. Most of these problems are NP-hard, and thus have no efficient exact algorithms unless P=NP. This course will focus on approximation algorithms: efficient algorithms that find provably near-optimal solutions. It will be organized around algorithmic techniques used for designing approximation algorithms, including greedy, local search, dynamic programming, deterministic and randomized rounding of linear and semidefininite programs, primal-dual, and metric embedding.

Prerequisites CSE 565; STAT 318 or MATH 318 (specifically, familiarity with algorithms for network flow, linear programming, and discrete probability; comfort with reading and writing mathematical proofs).

Evaluation The grade will be calculated as follows:

Homework assignments	45%
Midterm (the week before the spring break)	20%
Take-home final exam	30%
Class participation (includes Piazza bonus)	5%

Homework There will be weekly assignments (1-2 problems each), due **on Wednesdays at 11:59pm** on **Canvas**.

"I'll take 15%" option for HW problems Partial credit will be only given for answers that make significant progress towards correct solution. Understanding whether a solution is correct is an important skill. If you realize that you cannot solve a problem, you have an option of writing "I'll take 15%" instead of your answer. In this case, you will get 15% for this problem (or part of the problem). If you do write an answer, that answer will be graded and your score will be 0 if your solution is completely wrong. You **cannot** use the 15% option on optional problems or exams.

Partial Grading Only a subset of homework problems (not known to you in advance) will be graded. You are welcome to ask for feedback on ungraded solutions.

Collaboration and Honesty Policy Collaboration on homework problems is permitted. Please read and sign Collaboration and Honesty Policy, give it to me before the first HW is due, and keep a copy for your records.

No collaboration is permitted on optional problems and exams.