CS 331 Algorithms and Complexity
FALL 2014

Time: TTh 11:00 - 12:30. **Place:** CAL 100
Discussion Sections:
Unique number **52985** Friday 1:00 - 2:00, UTC 1.118
Unique number **52990** Friday 2:00 - 3:00, UTC 1.118

Professor: Anna Gál
e-mail: `panni@cs`, office: GDC 4.420, phone: 471-9539,
Office hours: TTh 2:30 - 3:30 or by appointment.
(Except September 23 and 25.)

Teaching Assistants: Siddhesh Chaubal and Chi-Kit Lam
e-mail: `siddhesh@cs.utexas.edu, geocklam@cs.utexas.edu`
TA Office hours:
Chi-Kit Lam M 10:30 - 11:30, GDC 1.302,
Siddhesh Chaubal W 1:30 - 2:30, GDC 1.302

Piazza: We will be using Piazza for class discussion. Find our class page at: https://piazza.com/utexas/fall2014/cs331gal/home

Prerequisites: The following coursework with a grade of at least C- in each course: CS 311 or 311H, 314 or 314H, 429 or 429H; M 408C or 408N; SSC 321 or M 362K; and a pre-req or co-req of M 340L or SSC 329C.

Course description: This course provides a general, undergraduate level introduction to algorithms and complexity. The course will cover the most important algorithmic techniques, and methods to analyze the performance of algorithms. The following major topics will be covered: graph algorithms, greedy algorithms, divide-and-conquer, dynamic programming, network flow, NP-completeness, undecidability, approximation algorithms, randomized algorithms.

Textbook: "Algorithm Design", by Jon Kleinberg and Eva Tardos.

Homework: There will be regular homework. The assignments will be paper/pencil exercises.

Exams: There will be three written tests during the course on **September 23**, **October 28** and **December 4** in class. No make-up exams will be given.

Grading: Homework: 25%, Test 1: 25%, Test 2: 25%, Test 3: 25%.

Course Schedule:

Aug 28	Introduction	
Sep 2	Running time, examples	
Sep 4	Graph connectivity	HW1 out
Sep 9	Greedy algorithms: scheduling	
Sep 11	Dijkstra's shortest path algorithm	HW1 due
Sep 16	Minimum spanning tree	
Sep 18	Review	
Sep 23	TEST 1	
Sep 25	Discussion of assignments and test	
Sep 30	Recursion, Divide and Conquer algorithms	HW2 out
Oct 2	Dynamic programming: scheduling	
Oct 7	Subset Sum and Knapsack problems	HW2 due
Oct 9	Bellman-Ford shortest path algorithm	HW3 out
Oct 14	Ford-Fulkerson maximum flow algorithm	
Oct 16	Max-flow min-cut theorem	HW3 due
Oct 21	Bipartite Matching	
Oct 23	Review	
Oct 28	TEST 2	
Oct 30	Intractable problems, the class NP	
Nov 4	Polynomial time reductions, NP completeness	HW4 out
Nov 6	Undecidability	
Nov 11	PSPACE	HW4 due
Nov 13	Approximation algorithm	HW5 out
Nov 18	Approximation algorithms	
Nov 20	Randomized algorithms	HW5 due
Nov 25	Randomized algorithms	
Dec 2	Review	
Dec 4	TEST 3	