

EE 382V: Social Computing

Prerequisites: Graduate Standing

Course Contents: This is an introductory course on social networks, markets and Internet computing. The emphasis of this course is on algorithms where multiple agents interact with each other. The following topics will be covered in the course:

- *Matching* Bipartite Matching, online matching, Hungarian algorithm, Auction-based algorithm
- *Stable Matching*: Optimal matching, enumerating all matchings, Kidney-Exchange
- *Auctions*: First-price, Second-Price Auctions, VCG Mechanisms
- *Games* Mixed strategies, Nash Equilibrium, Pareto Optimality, Social Optimality
- *Voting*: majority rules, positional voting, Arrow's Theorem
- *Experts Algorithm*: Multiplicative Updates Method
- *P2P Computing*: Consistent Hashing
- *Streaming Algorithms*: Sketches, Bloom Filter, Heavy Hitters
- *Privacy and Authentication*: Public Key Cryptography

Grading: 20 % Assignments, 15 % Exam 1, 15% Exam 2, 15% Project, 5% Class Presentation, 10% Scribe Duties, 20% Final Exam.

Course Material:

Lecture Notes provided by the instructor.

The following book is optional. **Networks, Crowds, and Markets: Reasoning About a Highly Connected World** by David Easley and Jon Kleinberg, 2010.

Course Website: We will use Canvas System available at <http://canvas.utexas.edu>

Add/Drop Policy: Adds and drops for graduate students taking graduate courses are not approved after the twelfth class day except for good cause. Applications for approval to drop a course after the twelfth class day should be made in the Graduate ECE Office.

Honor Code: The core values of the University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.

Pending Absence: By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Students with Disabilities: The University of Texas at Austin provides upon request appropriate academic adjustments for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4241 TDD or the College of Engineering Director of Students with Disabilities at 471-4382.