

COSC 6: Networks

Summer 2013

TTh 2:00-3:50, Sudikoff 115

Instructor: [Lisa Fleischer](#)

Distrib: TAS

• Course Outline

This course will examine how various social, technological, and natural worlds are interconnected, and how the study of networks can help us understand these connections. Some questions we will explore:

- how opinions, fads, and political movements spread through society;
- how to quantify robustness/fragility of food webs and financial markets;
- the technology, economics, and politics of Web information and on-line communities

Please see Chapter 1 of the text book for a more insightful and thorough discussion of what this course is about.

• Topics

- Graph Theory and Social Networks: general properties, "strength of weak ties"
- Game Theory: examples include auction design and traffic congestion
- Markets and Negotiation
- Information Networks and the World-Wide Web
- Network Dynamics -- Population Models: information cascades, "tipping points"
- Network Dynamics -- Structural Models: spread of disease, "six degrees of separation" effect
- Institutions and Aggregate Behavior: markets, voting theory, property rights

• Textbook

This is the main text book. We will occasionally use supplementary material.

David Easley and Jon Kleinberg *Networks, Crowds, and Markets*, Cambridge, 2010.

www.cs.cornell.edu/home/kleinber/networks-book/

• Prerequisites

This is an introductory undergraduate course. We will be using notions of basic probability (random variables, expectation, independence, conditional probability); and the main goal of the course is to build mathematical models of the processes that take place in networks relate these models to phenomena at a qualitative level. As such, any of Math 10, Econ 10, Govt 10, Psyc 10, Soc 10, Math 19, Cosc 30, or Math 20, would be fine, as would permission of the instructor.

• Additional Information

The course will consist of lectures, readings, homework, blogging, a midterm exam, final exam, and short paper. There will be approximately 6 homework assignments, each reinforcing the technical material covered in lectures and readings. Each student will make two blog posts over the course of the term to encourage discussion about topics relevant to the course. The course blog from last time the course was offered is coco6sp12.wordpress.com. The short paper (4-6 pp.) is designed to be an exploration of a topic related to the course.

Further information can be obtained from the instructor the first day of class.

Last updated June 2013.