

EVOLVING INFORMATION NETWORKS

COMP 4206/5310

Instructor: Evangelos Kranakis, Room: 5360 HP, Office hrs: Thu 12:30 to 14 pm.

1 DELIVERY METHOD

Blended delivery; scheduled time will be used for tests and lectures. Synchronous course, meetings via web conferencing tools on Zoom at scheduled time. Lectures will be live and also recorded and posted in CU Learn. The video conference link for the lecture is posted at the course web page on CU Learn. Homework, assignments and other activities will be completed as usual outside of class and submitted on CU Learn. Students are expected to be available during the synchronous meeting times.

2 COURSE DESCRIPTION

Convergence of social and technological networks. Interplay between information content, entities creating it and technologies supporting it. Structure and analysis of such networks, models abstracting their properties, techniques for link analysis, search, mechanism design, power laws, cascading, clustering and connections with work in social sciences.

4206 Prerequisites: COMP 2401, and one of COMP/MATH 1805, and COMP 2406

2.1 CONTENTS OF LECTURES

Basic material covered is derived from *Networks, Crowds, and Markets: Reasoning About a Highly Connected World* by David Easley and Jon Kleinberg. Parts of the course may also be based on papers published only in journals and/or conference proceedings. Following material will be covered.

1. **Week 01: (Jan 14)** Overview, Outline
2. **Week 02: (Jan 21)** Relationships
3. **Week 03: (Jan 28)** Contexts, Ties
4. **Week 04: (Feb 04)** Braess Paradox
5. **Week 05: (Feb 11)** Matching Markets **Assignment 1:** Due
6. **Week 06: (Feb 25)** Web Search **Quiz 1**
7. **Week 07: (Mar 04)** Power Laws, Growing Networks
8. **Week 08: (Mar 11)** Small World
9. **Week 09: (Mar 18)** Epidemics,

10. **Week 10: (Mar 25)** Cascades, Voting
11. **Week 11: (Apr 01)** Class Presentations, **Quiz 2**,
12. **Week 12: (Apr 08)** Class Presentations **Assignment 2: Due**

NB: Material covered in lectures may vary slightly depending on time available. Lecture Notes (LEC) and Class Notes (CLA) in PDF are posted in CULearn before the lecture, respectively, in a timely manner. Audio and video recording of the lecture will be provided in CU Learn.

3 STUDENT REQUIREMENTS

The course is attended by both graduate (**G**) and undergraduate (**UG**) students; course work will differ for the two groups. Following are the requirements for the course.

3.1 GRADING & COURSE WORK

Type of Test	#	% Each	% Total	Where
Assignments	2	10%	20%	Homework
Project	1	35%	35%	Homework
Project Presentation	1	5%	5%	In Zoom
Quizzes (30 min)	2	20%	40%	In CU Learn

3.2 QUIZZES

You should study everything that was covered in class.

3.3 Additional Details & Requirements

1. Students must submit to instructor a one-page abstract of the proposed project. In addition, students must make an oral presentation of their selected project/paper (this is not the same as written project) in-class (usually in powerpoint).
2. The project paper should be about 20 pages double spaced and the presentation of the project/paper must have the quality of a journal publication.
3. Students must submit to instructor 1) the presentation in electronic form, 2) the final project in pdf, and 3) source code..
4. Several projects will be suggested. The topic of the project may be suggested by the student (subject to approval of instructor), must be relevant to the material covered in the course and could be based on a very recent research paper.

4 USEFUL BOOKS

Your study should be based on the lecture notes as well as additional material provided. Although I may not follow the books below you can use them as a guide for supplementary

material and further study.

- Networks, Crowds, and Markets: Reasoning About a Highly Connected World by David Easley and Jon Kleinberg, Cambridge University Press. (Recommended). Available for download: <http://www.cs.cornell.edu/home/kleinber/networks-book/>
- The following books are useful but required.
 - Social and Economic Networks, M. Jackson, Princeton University Press, 2008.
 - Networks an Introduction, M. Newman, Oxford University Press, 2010.
 - The Structure and Dynamics of Networks, by Newman-Barabasi-Watts (eds)-Princeton University Press.

You can purchase the book(s) from any bookstore. There are many more sources and books available on the internet.