

# 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.

#### 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 **Quiz 1, Assignment 1:** Due
6. **Week 06: (Feb 25)** Web Search
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.

## Additional Useful Information

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### Important Considerations

“Late assignments are never accepted for any reason. Assignments submissions are handled electronically (i.e., through cuLearn) and there is no "grace period" with respect to a deadline - an assignment submitted even one minute after the deadline is late and will receive a mark of zero.

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### Undergraduate Academic Advisor

The Undergraduate Advisor for the School of Computer Science is available in Room 5302C HP; by telephone at 520-2600, ext. 4364; or by email at [undergraduate\\_advisor@scs.carleton.ca](mailto:undergraduate_advisor@scs.carleton.ca). The undergraduate advisor can assist with information about prerequisites and preclusions, course substitutions/equivalencies, understanding your academic audit and the remaining requirements for graduation. The undergraduate advisor will also refer students to appropriate resources such as the Science Student Success Centre, Learning Support Services and Writing Tutorial Services.

### SCS Computer Laboratory

SCS students can access one of the designated labs for your course. The lab schedule can be found at: <https://carleton.ca/scs/tech-support/computer-laboratories/>. All SCS computer lab and technical support information can be found at: <https://carleton.ca/scs/technical-support/>. Technical support is available in room HP5161 Monday to Friday from 9:00 until 17:00 or by emailing [support@scs.carleton.ca](mailto:support@scs.carleton.ca).

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### University Policies

For information about Carleton's academic year, including registration and withdrawal dates, see [Carleton's Academic Calendar](#).

**Pregnancy Obligation.** Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit [Equity Services](#).

**Religious Obligation.** Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit [Equity Services](#).

**Academic Accommodations for Students with Disabilities** If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or [pmc@carleton.ca](mailto:pmc@carleton.ca) for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting

accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the [Paul Menton Centre](#) website.

**Survivors of Sexual Violence.** As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: [carleton.ca/sexual-violence-support](http://carleton.ca/sexual-violence-support)

**Accommodation for Student Activities.** Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see [the policy](#).

**Student Academic Integrity Policy.** Every student should be familiar with the Carleton University student academic integrity policy. A student found in violation of academic integrity standards may be awarded penalties which range from a reprimand to receiving a grade of *F* in the course or even being expelled from the program or University. Examples of punishable offences include: plagiarism and unauthorized co-operation or collaboration. Information on this policy may be found [here](#).

**Plagiarism.** As defined by Senate, "plagiarism is presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own". Such reported offences will be reviewed by the office of the Dean of Science.

**Unauthorized Co-operation or Collaboration.** Senate policy states that "to ensure fairness and equity in assessment of term work, students shall not co-operate or collaborate in the completion of an academic assignment, in whole or in part, when the instructor has indicated that the assignment is to be completed on an individual basis". Please refer to the course outline statement or the instructor concerning this issue.