COSC 018 – Networks, Crowds, and Markets

Georgetown University – Summer 2022

Last updated: 12 January 2022

Course Details

Lectures: MTWR 3:30pm – 5:25pm in Reiss 559

Instructor: Ray Essick

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Office Hours: TBA or by appointment (either in-person or via Zoom)

Course Description

This course explores the impact of "connectedness" of modern society. Social, technological, and antural interactions can be represented using links in a network formed by people and other entities. This network impacts many phenomena, including the manner in which opinions and epidemics spread through society. This course will explore topics such as the spread of opinions, the small-world phenomenon, robustness and fragility of financial markets, and the structure of the Web.

Learning Goals:

By the end of this course, students will be able to

- Understand the basics of graph theory and network analysis
- Understand the basics of game theory
- Apply both graph theory and game theory to real-world networks and other information systems

Prerequisites

None

Required Textbook

Networks, Crowds, and Markets: Reasoning About a Highly-Connected World, David Easley and Jon Kleinberg. Available online at http://www.cs.cornell.edu/home/kleinber/networks-book/networks-book.pdf . Paper copies published by Cambridge University Press.

Assignments and Grading

During the course, you'll complete several different kinds of assignments/activities:

Discussion Posts

For each chapter/topic we cover (roughly one per day) you will contribute to an online discussion post on Canvas (our online LMS). These posts should encourage you to think about the chapter material and relate it to your life and interests (experiences, studies) and to the world outside the class. You'll also need to read your fellow students' posts and respond to them.

You'll earn three points for making a post of your own, and two more for responding to another student (for a total of five points per chapter).

To earn full points, you'll need to make your post by the end of Thursday (of the week we study the chapter) and reply to another post by the end of Saturday.

Written homework

Each week, I'll post a set of questions spanning the chapters/topics covered that week. These problems may ask you to write a short explanation, perform a short calculation, or draw a picture. You'll need to write answers to these questions and submit them either in-person (written/typed) or as an electronic (PDF) file to Canvas.

The written homework will be due at the end of Thursday; this lets me provide feedback before the weekly quiz is due. If you choose to type your solutions and/or submit electronically, you may use any software you like to do so.

You are free to discuss these written problems with your classmates, but the final submission should reflect your own solution/wording/work on the problems.

Weekly quiz

Each week, you'll complete a Canvas-based quiz which will have questions drawn from that week's material. You will have one submission attempt for each quiz. They will *not* be timed, so you may work on them until the due date and time. The quizzes will be due at the end of the day on Saturday.

You must work on the quizzes individually; if you have questions about your quiz, you can contact me via email and I will provide clarification.

Final exam

On the last day of lecture (August 11) there will be a cumulative (written) final exam. You will have two hours (i.e., the entirety of lecture time) to complete the exam.

Due to the fast pace of the summer session, this final exam will likely occur during the time frame of the final week's discussions/quiz.

Grading

Course grades will be calculated using the following weights:

- Discussion posts (18 total): 20%
- Written homework (5 total): 20%
- Weekly quizzes (5 total): 40%
- Final exam: 20%

I'll assign letter grades based on this cumulative grade and the following cut-offs.

		$93.0\% \leq s < 100\%$	A	$90.0\% \leq s < 93.0\%$	A-
$87.0\% \leq s < 90.00\%$	B+	$83.0\% \leq s < 87.00\%$	B	$80.0\% \leq s < 83.00\%$	B-
$77.0\% \leq s < 80.00\%$	C+	$73.0\% \leq s < 77.00\%$	C	$70.0\% \leq s < 73.00\%$	C-
$67.0\% \leq s < 70.00\%$	D+	$63.0\% \leq s < 67.00\%$	D	$60.0\% \leq s < 63.00\%$	D-
$s < 60.0\ \%$	F				

Course Policies

Deadlines

Unless otherwise noted, assignments are due by 11:59pm Georgetown local time (EST/UTC-5 or EDT/UTC-4 depending on date). Assignments submitted after the deadline will be graded subject to the following rules:

- Submissions less than 24 hours late earn at most 80% of points possible.
    - These are submissions received by 11:59pm the day after the due date
- Submissions between 24 and 48 hours earn at most 60% of points possible.
    - These are submissions received by 11:59pm on the second day after the due date
- Submissions more than 48 hours late will receive 0% but will still be graded and feedback will be provided

Exceptions to due dates and/or late policy require a documented, exceptional circumstance. Specifically, I will ask for an **email from your advisory dean** regarding the situation. This email is necessary and sufficient documentation (I will not require you to share personal details of your situation to "prove" your situation).

Academic Integrity

You should be familiar with, and abide by, the Georgetown University Standards of Conduct. You should also make reasonable efforts to prevent incidents of academic integrity. These include (but are not limited to) giving or receiving aid on an exam; submitting another student's work as your own or doing the work of another student; or any form of plagiarism.

Plagiarism is the intentional or unintentional presentation of another's ideas as your own. This includes (but is not limited to) copying verbatim all or part of another person's written work; using phrases, figures, or illustrations without citation; paraphrasing the ideas of another person without citation; and using all or part of a work without attribution.

Generally, conversations with course staff (faculty or TA) at the level of a "whiteboard" discussion are permitted, while sharing large, syntactically complete blocks of code is not. Using general ideas found in outside sources without permission is permitted; copying code verbatim from another repository or StackExchange is not (and will likely generate more problems than its worth).

Briefly, don't cheat. Dealing with cheating is the worst part of teaching and I hate doing it. **If you are unsure if something is permitted, ask!** This will save us both a headache.