

INFO 4220 NETWORKS II: MARKET DESIGN

(CS 4852 / ECON 3825 / INFO 6220)

Cornell University – Spring 2023

Prof. Cristobal Cheyre Forestier

Information Science – Gates Hall 215

cac555@cornell.edu

Grading basis:

3 Credits, Letter Grade Only

Pre-requisites:

INFO 2040, CS 2800 or equivalent. Knowledge of basic probability and statistics expected.

Lectures:

Tuesday, Thursday: 9.40 – 10.55AM (28 sessions)

Hollister Hall B14

Office Hours:

Prof. Cheyre: Monday 11.00am – 12.00pm, or by appointment. Gates Hall 210.

Course Description:

Networks II builds on its prerequisite course and continues to examine how each of the computing, economic, sociological and natural worlds are connected and how the structure of these connections affects these worlds. In this course, we will construct mathematical models for and analyze networked settings, allowing us to both make predictions about behavior in such systems, as well as reason about how to design such systems to exhibit some desirable behavior. Throughout, we will draw on real-world examples such as social networks, peer-to-peer filesharing, Internet markets, and crowdsourcing, that illustrate these phenomena.

Course Objectives:

In the last 10 years we have seen a shift in the makeover of the world's most valuable companies. Most of the most valuable firms are now technology firms that operate as platforms in multi-sided markets. During this period, economists have improved their understanding of how markets operate and have developed a number of techniques to design markets that incentivize certain outcomes. In this course we will use different modelling techniques to understand how markets operate and how we can design them to influence agents' behavior and produce the outcomes we need. We will also explore what defines network economies, multi-sided markets, and platforms. At the end of the course the students will be able to:

- Define metrics to evaluate the performance of markets and prioritize a set of desired characteristics.

- Evaluate the performance of existing market mechanisms and identify the factors driving the outcomes.
- Design market mechanisms that produce desired outcomes.
- Apply microeconomic theory and game theory to analyze markets and network industries.

How to Contact Us:

For questions about the course, homework, tests, etc. please use Ed Discussions.

If you have a problem with the grading of a homework or test, please write a re-grade request using the form available in CANVAS. All re-grade requests must be submitted **within one week** of receiving the grade. Please explain your issue clearly and in a professional way.

For requests regarding missed work, or other special accommodation requests, please read below.

If you have a personal issue you would like to discuss (and that you prefer not to share in Ed Discussions), please contact Prof. Cheyre. Please start your subject with [INFO 4220] to maximize your options of a quick response.

Accommodations for Students with Disabilities

Your access in this course is important to me. Please give me your Student Disability Services (SDS) accommodation letter **during the first three weeks of the semester** so that we have adequate time to arrange your approved academic accommodations. If you need immediate accommodation, please speak with me after class or send an email message to me and/or SDS at sds_cu@cornell.edu. If the need arises for additional accommodations during the semester, please contact SDS.

SDS is located on level 5 of Cornell Health, 110 Ho Plaza, 607-254-4545, sds.cornell.edu

Textbook and Other Material:

There is no required textbook for the course. However, the course is based on the book “Market Design: Auctions and Matching” by Guillaume Haeringer. For each lecture, I have listed the relevant chapter from the book. You may want to refer to the book if you are struggling with the material.

Additionally, for each lecture I list a set of recommended readings. These are mostly the journal articles that introduce the concepts we are studying. Some of them contain technically difficult sections. You do not need to understand all the math in the articles to benefit from reading them.

Use of Online Services and Resources and/or Posting of Course Material

Using online services and resources other than the course’s CANVAS sites and Ed Discussion forum is strictly forbidden. Posting, or selling, any material related to the course is not permitted under any circumstance. Such unauthorized behavior constitutes academic misconduct.

Assignments/Grading:

Problem Sets (30%)

There will be 5 problem sets throughout the semester. You must turn them in by 11.59PM EST on the due date using GradeScope.

In Class Prelim 1 (20%)

In Class Prelim 2 (20%)

Final exam (30%)

Students enrolled in INFO6220 will have to complete an additional take-home exam activity to fulfill the graduate-level course requirement. The additional take-home exam activity will be worth 35% of the final exam grade, while the common final exam will be worth 65% of the final exam grade.

Class Participation Bonus (up to +5%)

During the lectures we will be doing several activities, including polls and games. To encourage participation and engagement, I will provide, in every lecture, a bonus to those that participate and obtain a total score in the top 33%. For example: If there are 20 lectures with activities in the semester, each lecture you earn a bonus you will obtain a 0.25% bonus. This means that throughout the semester you can obtain up to a 5% bonus through participation in the activities. The exact number of lectures with activities, and the bonus awarded per day will be adjusted depending on what happens in the semester (i.e. the number of lectures with activities) in order to make it possible to earn up to a 5% bonus through class participation.

Grading Scale:

Letter grades will be assigned to scores according to the following table. Note the table below indicates the minimum scores necessary for each letter grade. The distribution of grades *may* be adjusted so that at least 30% of the class obtains a grade in the A range, and 35% obtains a letter in the B range (i.e. the cutoff scores can be lowered so at least 30% of the class gets an A, but they will not be raised if more than 30% of the class is getting an A).

98-100	A+		70-74	C
94-98	A		65-70	C-
90-94	A-		60-65	D+
86-90	B+		55-60	D
82-85	B		50-55	D-
78-82	B-		0-50	F
74-78	C+			

Re-grade requests

If you have a problem with the grading of a homework or test, please write a re-grade request using the form available in CANVAS. All re-grade requests must be submitted **within 1 week** of receiving the grade. Please explain your issue clearly and in a professional way. No requests will be considered after 1 week.

Missed work

To account for personal problems that may prevent you from turning in a problem set in time, or affect your performance, I will drop the worst problem set grade and calculate the score considering only the 4 best problem sets.

Additionally, everyone gets 2 slip-days for turning in a problem set up to 1 day late. **You must indicate when turning in your problem set if you are using one of the slip-days.** Note you can only use them in

one day increments (i.e. you cannot use 6 hours of one and save the remaining 18 hours for later. You either use a day or not).

No explanation is needed to drop the worst PS (which I will do automatically for everyone) or to use the slip-days (although you must specify if you are using a slip-day when turning in a late assignment).

With respect to exams, I will follow the recommendations of Cornell's faculty handbook (<https://blogs.cornell.edu/deanoffaculty/files/2015/12/Chapter5-1lrdm5s.pdf>). The handbook suggests that faculty consider special accommodations in four types of situations. However, whether to provide accommodations is ultimately an individual decision of the faculty member. I will handle these situations in the following way:

- Illness, or family/personal emergency: Contact the advising dean for your college. The advising dean will then contact me directly and I will decide based on the case.
- Employment interviews: Provide me with evidence of the interview, and that you cannot change the date.
- Religious observance: I tried to avoid all conflicts. If you have one, please contact me within the first 3 weeks of class.
- Athletics/Extra-curricular activities: Provide the standard permission slip at least 2 weeks before the exam.

I will consider accommodations for time conflicts with exams only if you have a direct conflict, or more than 2 exams in 24 hours.

Academic Integrity:

Academic integrity is expected of all students of Cornell University at all times, whether in the presence or absence of members of the faculty. Violations of the code of academic integrity will be prosecuted through the Academic Integrity Hearing Board. For more information, see the following page on academic integrity: <https://cuinfo.cornell.edu/aic.cfm>.