MATH 344 - Game Theory

Announcements

- We are using a discord forum this term. The TA and I will answer questions there, and post course related announcements. It is open for all students to join.

Syllabus

This course covers several topics in Game Theory, an area of Mathematics with multiple applications to Economics, Political Science, Evolutionary Biology, and many other fields. We will encounter important mathematical concepts such as combinatorial methods, fixed point theorems and convexity methods as they are used to prove fundamental results in Game Theory. Topics include:

- Combinatorial games (Chess, etc.): extended and strategic forms, Sprague-Grundy theory, games with chance.
- Zero-sum games (Poker, etc.): Matrix form, minimax theorem, pure and mixed strategies.
- General sum games (Global Thermonuclear War): Nash equilibria, repeated games and evolutionary dynamics, incomplete information.
- Coalition games and Shapley values.
- Auctions and mechanism design.
- Social choice: voting, Arrow's theorem, stable matchings.

Course details

Instructor: Omer Angel. Contact me through discord or by email. Please include "**math344**" in the subject line.

TA: TBA. If you have any comments for the TA, go through me.

Class times: TT 12:30. Lectures will take place at CHBE 102. It is possible that some lectures will also be accessible through zoom.

Office hours: Office hours will take place Monday 10:30 online(zoom:64971386517, password:4) and Tuesday 14:00 in MATX 1210, or by appointment.

Online forum: We will use a discord forum this term. You can ask any questions regarding the course there. An invite link will be shared later. You are encouraged to ask questions there on lectures, assignments, and any course related topic. You are also encouraged to answer other students' questions. Significant participation will receive extra credits. Obviously, **do not** share solutions to assignments (on discord or elsewhere) before the due date.

Textbook: The main book we will follow is Game Theory, Alive, by Karlin and Peres. It is available online. Many other books on game theory exist, and may be helpful.

Evaluation

The final mark will be based on:

- 1/6 homework
- 1/3 midterm
- 1/2 final exam

Additional credits may be given for significant participation in class or on discord.

Missed work: There are no make-up midterms or assignments. Missing a midterm for a valid reason normally results in the weight of the midterm being transferred to the final exam. Personal travel and work conflicts are not considered valid. A student who misses the midterm must submit UBC's self-declaration form within 72 hours of the midterm date or as soon as possible. See the UBC Senate's Academic Concession Policy V-135.