# MATH 344 GAME THEORY JAN. 2024

## Basic info

**Instructor:** Omer Angel.
**Contact:** angel@math.ubc.ca
**Lectures:** TT 9:30-11:00 at CHEM 124.
**Course webpage:** `http://www.math.ubc.ca/~angel/344`
**Office hours:** Tue. after class, Wed. 11:00 at Math annex 1210, or by appointment.
**Discussion board:** We will use a discord discussion board this term. Link soon. You can ask any questions related to the course there. You are strongly encouraged to answer other students' questions there. Obviously, **do not** share solutions to assignments (on the forum or elsewhere) before the due date.

## Course outline

The course will discuss several mathematical aspects of the Game Theory, an important area of Mathematics with multiple applications to Economics, Political Science, Evolutionary Biology, and many other topics. The course will be based selected chapters from "Game Theory, Alive" By Karlin and Peres. The book is freely available from the authors at
`https://homes.cs.washington.edu/~karlin/index.html#Book`
See below for additional resources. Topics to be included:

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

## Evaluation

The final mark will be based on homework (1/6), one mid-term (1/3) and the final exam (1/2).

**Homework:** Weekly assignments will be given. These are due at the **beginning** of class on the due date. Assignments submitted later the same day will receive 50% of the mark. No later assignments be accepted for credit. All assignment submissions must be typeset. Your lowest assignment grade will be disregarded.

**Mid-term:** A mid-term will take place during class on 2024-02-27.

**Final Examination:** will take place with April exams. Please do not make travel plans before the exam schedule is announced.

**Missed midterms and assignments:** There is no make-up midterm or assignments. Missing the 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 the Department of Mathematics self-declaration form within 72 hours of the midterm date. See the UBC Senate's Academic Concession Policy V-135.