

## Basic info

**Instructor:** Omer Angel.

**Contact:** angel@math.ubc.ca

**Lectures:** Tuesday+Thursday 11:00–12:30, Math Annex 1100.

**Course webpage:** <http://www.math.ubc.ca/~angel/344>

**Office hours:** Tuesday 10:00-11:00, Wednesday 14:30-15:30, Math annex 1210, or by appointment.

**Discussion board:** We will use a piazza discussion board this term. You can ask questions regarding the course there. It is encouraged to answer other students' questions there. Significant participation will receive extra credit. Obviously, **do not** share solutions to assignments (on piazza 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 and 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 (15%), mid-term (35%) and the final exam (50%). Additional credits may be given for participation in class or in the piazza discussion board.

**Homework:** Weekly assignments will be given. These are due at the **beginning** of class on the due date, normally each Thursday. Assignments handed in by Friday will receive 50% of the mark. No later assignments be accepted for credit. The single lowest assignment grade will be ignored, as will any assignments you are exempted from (see below).

**Mid-term:** A mid-term will take place during class at a date to be determined.

**Final Examination:** will take place in the December examination period. Please do not make travel plans before the exam schedule is announced.

**Missed mid-terms and assignments** will normally receive a zero grade. Exceptions may be granted by **prior consent** from me, or for a documented **medical emergency**. In case of medical problems, notify me as soon as possible (preferably before the test or due date), and present a doctor's note immediately after your return to UBC. If you miss and are exempted from the midterm, there is no make-up test, and the final exam mark will be used.