

## 432. Game Theory (Fall 2021)

Instructor: Ryan Hynd ([rhynd@math.upenn.edu](mailto:rhynd@math.upenn.edu))

Office: DRL 4N42

Office Hours: Wednesdays 4:30-6:00pm and Thursday 3:30-4:30pm

Lecture: Tuesdays and Thursdays 8:30am-10:00am

Dates: Tuesday August 31, 2021 – Thursday December 9, 2021

Class location: DRL A2

Grader: Matthew Wiener ([mpwiener@math.upenn.edu](mailto:mpwiener@math.upenn.edu))

Prerequisites: familiarity with probability, linear algebra, calculus

Textbook: Game Theory, Alive by Anna Karlin and Yuval Peres. We will attempt to cover parts of Chapters 1-5, 7, 11, and 13.

Description: This course will be an introduction to game theory. Specifically, we will learn how to use mathematics to study various questions which arise when playing games between two players (tic-tac-toe, chomp, Nim, hex, go, chess, penalty kicks, military pursuit games, etc). We will also study ways that multiple self-interested agents interact. These situations arise when considering topics such as bargaining, fair division, auctions, voting, and network formation. Finally, we'll identify some applications of these ideas in economics, business, biology, and the social sciences.

Piazza: We will use Piazza as a forum to discuss topics outside of class. You should have received an email about this; in case you did not, you can access the course Piazza discussion [here \(Links to an external site.\)](#). This is an excellent venue to direct your math related questions; of course you also are encouraged to ask questions during office hours.

Grading: 49% Homework, 17% first quiz, 17% second quiz, 17% third quiz.

HW: 9 HW assignments consisting mostly of problems from the textbook. HW will be due on Thursdays. Each assignment must be neatly written or typed and submitted online to the grader. You must submit a single pdf file for each assignment. Do not make it a habit of turning in HW late. You may collaborate on HW, but you must write your own solutions.

Quizzes: There will be three online quizzes to be done during class time on canvas. See the list of important dates below and please mark your calendars. There will be no makeup quizzes. If you miss a quiz for an appropriate reason, your other two quizzes will be weighted accordingly. If you miss two quizzes or the third quiz, you will receive an incomplete.

Devices: Please avoid using your phone in class; the majority of the time it can wait. Unless the entire class is doing an exercise which requires a laptop, I will also ask that you do not use your laptop in class. If laptop use is essential to your success in the course, please see me about this. If you prefer to take notes on a tablet that is fine; however, I will ask that you restrict your tablet activity to note taking.

Important dates:

8/31 First day of class

9/30 Quiz 1

10/14 Fall break holiday

11/4 Quiz 2

11/25 Thanksgiving holiday

12/9 Quiz 3 and last day of class