ECON 402: Decision Making and Strategy in Economics

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1.- Introduction

- Game Theory studies decision-making in the presence of *interdependence*, where the decisions of one agent affect the well-being of other(s).
- In these settings, each agent must anticipate somehow the decisions of others. The procedure for making decisions in anticipation of the actions of others is called a *strategy*.

- Modern game theory studies situations of interdependence through a *game*, which is a rigorous mathematical representation (description) which includes:

1. The list of **players**.
2. The **actions** available to each player at each possible point in the game.
3. The description of players' available **information** at each possible point in the game.
4. A specification of all possible **outcomes** of the game and how each outcome arises from players' actions.
5. A specification of players' preferences over each outcome, or players' **payoffs** for each outcome.

- Broadly speaking, there are two general types of strategic interdependence:

    1. Situations where agents have to make decisions *individually*.
    2. Settings where agents have to make decisions *collectively*.

- ***Noncooperative*** game theory studies models of individual decision-making.
- ***Cooperative*** game theory focuses on collective decisions.
- Some models may involve both individual *and* collective decisions.

- Game theory is a technical subject. However, it can have many real-world applications.

- It has been used, for example to analyze and predict:

➢ Entry decisions into geographic markets by competing firms (e.g, Home Depot vs. Lowe's).

➢ Entry decisions into travel routes by airlines.

➢ Bidding behavior in auctions.

Information about the course

- The **syllabus** has been posted on **Angel**.
- **Midterm Exams:** There will be TWO midterms (non-cumulative) on:
  - **Thursday, October 3rd.**
  - **Tuesday, November 5th.**
- **Final Exam:** Comprehensive. Date to be determined by the university.
- **Homework:** There will be 8-9 homework assignments. Two lowest homework grades will be dropped.
- **Final grade composition:**
  - Homeworks: 20%
  - Midterms: 25% each
  - Final exam: 30%

Information about the course

- **Instructor:** Andres Aradillas-Lopez
- **Instructor email:** aaradill@psu.edu
- **Office Hours:** Wednesdays 3:30-5:00PM.
  Room: 518 Kern

- **TA:** Tsz-Ning Wong (pronounced “Zee-Ning”)
- **TA email:** tvw5087@psu.edu
- **TA Office Hours:** Mondays 4:30-6:00PM.
  Room: 403 Kern

Information about the course

- **Textbook:** Joel Watson. *Strategy. An Introduction to Game Theory,* Third Edition. Norton.
- **Level of Mathematics:** Game theory is a technical subject, so having a proper mathematics background is essential.
- Students should be very comfortable with:
  - Set notation.
  - Algebraic manipulation.
  - Basic probability theory.
- See Appendix A of the textbook for an overview of the matmematical concepts needed for the course.