

## COURSE 005. INTRODUCTION TO GAME THEORY

### Part I

**Time and Location:** Room # Lecture Theatre.

**Lecture Hours:** Tuesday 10.25-11.35  
Wednesday 10.25-11.35  
Thursday 10.25-11.35

There will also be a tutorial or problem-solving session every week, in smaller groups.

#### Objective.

To be introduced to Noncooperative Game Theory at a Master's level. While all concepts will be introduced from scratch, there will be an element of rigor in the description of concepts, as well as statements and proofs of some main results. However, as a first course, the evaluation will largely examine your ability to understand, analyze and 'solve' games.

**Description.** There are 2 parts to the course.

1. Static and Dynamic Games of Complete Information (Instructor: AB)
2. Static and Dynamic Games of Incomplete Information (Instructor: UBS)

There will be two midterm exams, and a final exam, with a 30-70 marks split.

I will put out lecture notes from time to time. Apart from this, there will be one main reference for each section, which you are expected to read and follow. There are many textbooks besides the ones referred to, and if you are interested in game theory, you may want to pick up one of these and read it through. At the graduate level, there's Fudenberg and Tirole (FT), Osborne and Rubinstein (OR), Myerson, Maaschler-Solan-Zamir, and several others. Sometimes, these can be hard to follow, and it may be worthwhile to read Gibbons or Osborne alongside if this is the case. There are also several classics or bedtime books, including Schelling's "The Strategy of Conflict" and Dixit's and Nalebuff's "The Art of Strategy".

It bears repetition that you should emphasize applying the tools to solving for equilibria etc. in lots of games.

#### Course Content for Part 1

- (1) Games in Strategic Form and Nash Equilibrium. (FT, Chapter 1. I will only skim 1.2.4, and will not cover 1.2.5).
- (2) Iterated Strict Dominance and Rationalizability (FT, Chapter 2, Section 2.1. I will cover this topic briefly; you may want to follow the lecture notes closely).
- (3) Extensive Form Games. (OR Chapter 6. The lectures will have some details on extensive games with imperfect information that are not included in this chapter. If you

wish, you could look at the early part of OR, Chapter 11). FT, Chapter 3 is an alternative to this reading.

(4) Applications: Repeated Games; Bargaining. We will possibly be midway here when Part I time is up. I will refer to some material for whichever subsection I'm on here, later.