Game Theory – Is This Course For You?

The information below (*in addition* to the Detailed Course Information page) will help you make a more informed decision on choosing this course for the semester.

1. This is an introductory course

We start everything from scratch. If you have never even heard of game theory before, this is the place to start (nevertheless, those who have should still read on).

2. This is a course about game theory itself

This is *not an economics course* and there is no bias towards any particular field of application. We of course use examples from economics, biology, political science, etc.

3. This is an in-depth course

You are not introduced to a "baby" version of the subject. We are thorough and do not shy away from questions touching the fundamentals of why the theory should work (or not). As much as it is possible at this stage of your mathematical thinking, we transition from "true because it looks like it on the diagram" to *proper mathematical modeling and proof*. This way, even if you had game theory before, this course will likely contribute to your better understanding of the subject, in turn substantially.

4. This is an applied mathematics course

Game theory is an applied mathematics discipline; its determining side is the real-life phenomena it tries to model. In this course we talk about real-life things almost as much as we talk about mathematics. For example, at a certain point of the course, we talk about *experiments*. The important role mathematics plays is being the (indispensible) *tool* to build the consistent (abstract) "mental picture" for our understanding of a real life situation. Mathematics forces us to be very clear about what assumptions we are making and it guides us as to the implications of these assumptions.

If you have started developing a comfort zone within pure mathematics, this course will move you (in and) out of it; this way it will contribute greatly to your understanding of what it means to transform descriptions "in English" into mathematical models. It is also great to see some of the mathematical notions you might have already learnt (like simple set theory, probability theory, vectors and matrices) in action!

5. Mathematical prerequisites: naïve set theory and some mathematical maturity

This course is offered in a *mathematics* program, it therefore has a *rigorous* mathematical side. "Rigorous" here does *not* mean that you have to know "a lot" of mathematics. Rather, it means that you have to have a *proper understanding* of the *basic building blocks* of three areas (see below) of mathematics. Additionally, it also implies a certain way of thinking, i.e.: "thinking mathematically" (usually acquired through some exposure to abstract mathematics).

It is *vital* that you are familiar with **naïve set theory** (*sets* and *set operations*, *Cartesian products*, *relations and functions and their properties*, *inverses*). Having a reasonably well-established working knowledge of *sets and relations/functions between sets* is necessary to understand the mathematical side of this course.

In the second half of the semester, we use elementary **probability theory**, **vectors** and **matrices** (i.e.: vector spaces and linear functions). If the background of the class makes it necessary, I will introduce these in a self-contained format in an extra class.