

## Game Theory – Is This Course For You?

The information below 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 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). In as much as possible at this stage in the development of your mathematical thinking, we try to transition from “formulas popping up here and there” to proper mathematical modeling. Even if you had game theory before, this course will likely contribute to your understanding of the subject, in turn substantially.

### 3. 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. It 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 process will contribute greatly to your understanding of what it means to transform “real life things” to mathematical models. It also great to see some of the mathematical notions you might have already learnt (like simple probability theory, vectors and matrices, some real analysis) in action (see next)!

### 4. Mathematical prerequisite: simple set theory

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 good understanding of a few basic notions of few areas (see below) of mathematics. Additionally, it also implies a certain way thinking, i.e.: “thinking mathematically” (usually acquired through some exposure to mathematics).

Technically, it is vital that you know **simple set theory** (*sets and set operations, Cartesian product of sets, relations and functions and their properties, inverses*).

Knowing that mathematics is based on sets and relations/functions between sets is necessary to understand the mathematical side of the course.

In the second half of the semester, we use some elementary probability theory, vectors and matrices and the Extreme Value Theorem from real analysis. If the background of the class makes it necessary, I will introduce these in a self-contained format during lecture and/or in an extra class. If you sign up for the probability class here at the BSM, you will have the probability tools covered by the time we start using them in this class and you will immediately see them “in action”!