

# MICROECONOMIC THEORY I, PART I

MARCIN PEŃSKI

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**Objectives.** This class combines the first part out of four parts of the Ph.D microeconomics sequence. There are two objectives.

- (1) The primary objective is to introduce you to the foundations of microeconomic theory. The class is devoted to single agents and consists of the choice theory, the consumer theory, firm theory, methods of comparative statics, the decision theory under uncertainty, and risk. Although most of you have seen the elements of the consumer's and the firm's theory in either your undergraduate or master's education, our approach is going to be very different from what you know. We are going to be much more formal and analyze things at a much more fundamental, deep level. For example, in your undergraduate class, you would start the consumer theory with writing down the consumer problem, i.e., utility maximization given the budget constraint. Here, we derive the consumer problem from the basic choice theory and formally prove when observable choices of the consumer can be represented (or interpreted) as the utility maximization problem.

For the great majority of you, the latter two topics will be completely new. The goal of the comparative statics is to provide you with a basic set of mathematical tools to analyze the effects of the change of parameters on the variables of interest in a whole range of problems across all areas of economics. In the last part, we study foundations of the expected utility model and various uncertainty related behaviors.

- (2) The second, and more universal, objective of this course is to introduce you to the formal approach to the economic argument. The class is proof-based and most of the lecture is going to proceed in the rhythm of definition-theorem-proof-example. You will learn how to read the proofs and how to carefully write them.

Because the topics are either new, or approached in a novel way, and because most of you haven't seen a proof-based class before, many of you will find that it is a difficult class, perhaps the most difficult course you have ever taken. It is essential that you allocate a sufficient amount of time to study for this course, and that you study in a right way. You can find some advice how to do it below.

**Prerequisites.** I assume that you have all taken or otherwise are familiar with the material covered in the math refresher course ECO1011, L0101 Mathematics and Statistics for PhD and MA Doctoral Stream Students.

**Course organization.** The course has the following elements

- Live lectures, Tue-Thu 9-11am\*.
- Tutorial Thu 2-4pm\*.
- Office hours -Th 11.30-1.30
- Readings: The required textbook is Microeconomic Theory by MasCollé, Whinston and Green (MWG for short) - we are going to use it for the first 5 lectures and a bit in the last two. For the remaining parts, I will provide class notes.
- Assessments: The grade for my part of the class will consist of 90% of final exam and 10% for problem sets.
  - Problem sets: There will be regular weekly problem sets. Each problem set consists of 5-6 questions. Before each tutorial, there will be a sign-up sheet which problems you solved. You will be randomly selected to present a problem during the tutorial. Your problem set grade will be a function of how many problems you signed up and how many you presented well.
  - Midterm will take place in-person in class on October 15th.

I will post past midterms on Quercus. You can also find the past comps (but I don't remember where - either through the library or some departmental site).

**How to study for this class.** This is a difficult class. I expect that you will spend at least 3h+ a day working on this course. Here is some advice how to do it effectively and how to know whether you understand the material:

- Ask questions. Whenever you don't understand something on the video, stop, go to Piazza and write questions during the lecture. Almost of the time, if you have a question, others students also are confused. For those rare occasions that you are the only confused person, your question will allow other students to catch breath and refresh their notes. This is a graduate class - if I don't hear any questions, I am going to assume that everything is clear and continue writing. And I can write fast.
- Talk to me during the office hours. If you want to talk to me but cannot come during the office hours (or the office hours are not enough), ask me to find some other time. I will try to make my best to accommodate you. (I am going to be less sympathetic for a request to meet outside of the office hours coming during the last week before midterm and from a student who have never talked to me before.)
- Make sure that you have all the required material. The readings contain strictly more material than the lecture. In the same time, although you are required to read all the assigned material, I find it difficult to imagine a situation that I would ask for a part of material that was not covered during the lecture or the problem set.
- Read all the readings and your lecture notes. Review past lecture notes regularly.
- There is an easy way to check whether you understand the material. Close the book or your lecture notes, and repeat what you have just learned. Can you restate the definition? The theorem? Do you remember the proof? Can you describe an application of the theorem in an example? Can you do it 3 days after you studied them? Do you remember the solutions to the problem set from two weeks before? Etc.

- Work on all problems. Do not worry if you cannot solve it, just try again later, or on the next day, or 3 days later. If you don't solve it before the tutorial, make sure that you understand where and why you were stuck. Talk to me about it.