

# Bavarian Graduate Program in Economics- Microeconomics

Lecturers: Paola Manzini and Marco Mariotti

Queen Mary, University of London

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## Course aims and objectives

Microeconomic theory concerns the behaviour of individual economic actors (e.g. firms, consumers) and the modeling of economic activity as the interaction of economic agents pursuing their private interest. In the short space of this course we will aim at providing you with a firm grounding in individual and strategic behaviour.

You will be presented with a set of concepts and mathematical techniques which will enable you to understand what various economic models are meant to explain, how they are built, and the consequences of their assumptions in terms of the applicability of their predictions.

This course centers on the analysis of the behaviour of individual agents. We start with some mathematical notions and look at modeling individual preferences and at how to represent them by means of a utility function. Next, we move to decision under risk and the concept of von Neumann-Morgenstern utility. Then we focus on the neoclassical analysis of consumer theory, with special emphasis given to duality techniques. In the last part of the course we use these tools to analyse the strategic interactions between economic agents, and look at applications to economic relevant models like auctions and bargaining.

The analytical tools required for this course meet the standard expected at graduate level. We do not use mathematics for the sake of it, but rely on formal analysis as a language that makes communication more precise and effective.

By the end of the course you will have achieved a better understanding of several areas of microeconomic investigation. The approach to the analysis of the various topics is rigorous. For each topic we set up a formal framework in which to conduct our analysis. We give rigorous and formal proof of most results, rather than just go through an endless list of properties. By the end of the course you should be able to reason formally and distinguish a well constructed argument from an unsupported one. You will also be conversant in the use of mathematical

techniques applied to economic problems, and able to describe and analyse them by constructing the appropriate formal framework of analysis.

## Teaching method

The course consists of daily meetings. We will devote the morning meetings to formal lectures, and the afternoon meetings to tutorial. The first afternoon session will give you an opportunity to attempt to solve the daily problem sets, which we will review together in the evening session.

More precisely, the schedule will be as follows:

9:00–10:30 First Lecture

11:00–12:30 Second Lecture

13:30–16:00 Problem Sets

16:30–18:00 Discussion of Problem Sets and Review

Lectures and tutorial classes are complementary. The objective of the lectures is to present you with the course material. Tutorials are a fundamental part of the course, and it is therefore very important that you put the effort to attend all meetings. They are aimed at reinforcing your understanding of the topics presented in the lectures, and will enable you to tackle applications related to the topics covered in the lectures. You are expected to attempt to answer all of the problems before the tutorial, and to present your results in the tutorial (either alone or in groups). Your active participation in both lectures and (especially) tutorials is essential.

You will be provided solutions for all the questions in the problem sets, although they may contain more questions that time will allow us to discuss in class. These exercises will not be marked, but solving these problem sets and examining the answers will enhance your understanding of the theory (and improve your performance in the final exam). This will consist of a two hour written examinations at the end of the course, which determines entirely your final mark in this course.

The exact material to be covered for these exams will be indicated in class. It will be based on the literature list below, plus everything discussed in class. For a successful completion of the course you are required to attend all classes, to attempt to answer all questions before a class, and to perform successfully in the final exam.

List of topics:

Monday Choice Theory

- mathematical preliminaries (sets, relations);

- utility representation.

Tuesday Choice under risk:

- Von Neumann Morgenstern expected utility theory;
- topics in non expected utility theory.

Wednesday Topics in Consumer Theory with duality:

- direct and indirect utility functions;
- Marshallian and Hicksian demands;
- relations (Sheperd's lemma, Roy's identity, Slutsky restrictions, etc.)

Thursday Game theory I:

- normal and extensive forms with corresponding equilibrium notions (existence, applications to auctions);

Friday Game theory II:

- applications to bargaining.

Below is a list of standard advanced microeconomics textbooks. We will rely mainly on Mas Colell, Whinston and Green, but we leave you free to choose which text suits you best:

- G. A. Jehle and P. J. Reny, "*Advanced Microeconomic Theory*";
- D. Kreps, *A Course in Microeconomic Theory*, Harvester Wheatsheaf, 1990.
- A. Mas-Colell, M. Whinston and J. Green, *Microeconomic Theory*, Oxford University Press, 1996.
- M. Osborne and A. Rubinstein, *A Course in Game Theory*, MIT Press 1994
- Fudenberg and Tirole, *Game Theory*, MIT Press, 1991.
- David Kreps, *Notes on the theory of Choice*, Westview Press, 1988 (KC in the syllabus).

As to prerequisites, it would help if students had some knowledge of the notions of logical connectives and quantifiers, methods of proof, elementary set theory and binary relations and their properties. As an indication, two nice little books that cover this material are:

- Gary Chartrand, Albert Polimeni and Ping Zhang (2003) “Mathematical proofs - A transition to advanced mathematics”, Addison -Wesley (esp. chapters 1-5; 7.1-7.4; 8)
- Keith Devlin “Sets, Functions and Logic”, CRC Press. (esp. chapters 2.1-2.5; 3-5)