



Masaryk University in Brno
Faculty of Science
Department of Mathematics and Statistics

Course syllabus

Course name:

Mathematical methods in Economics (Spring 2013).

Schedule

Lectures: Tuesday, 1300 – 1600.

Office hours: Tuesday, 1600 – 1700.

Midterm and final exams: TBA.

Instructor

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Course objective and structure

The purpose of the course is to familiarize students with the basic concepts of the modern Economics and show their application on the examples of individual labor supply, taxation, social security systems and auctions. Students are expected to have elementary knowledge of calculus and the basics of Microeconomics.

The course starts with the revision of consumer theory, which is directly applicable to the model of labor supply and the discrete version of the human capital accumulation model. We will later show the distortive role of taxation and generalize the consumer problem to the infinite setup. This generalization will allow consideration of the overlapping generations model and discussion of its predictions for funded and unfunded social security systems.

After the midterm examination we will go over the basics of the producer theory. Next, using illustrative examples we will see how two consumers, consumers and producers, consumers and the government interact and the endogenous price vector is determined. On the last two lectures we will look into the mathematical apparatus for the auction theory.

Grading

Midterm exam – 30%, final exam – 30%, two homeworks – 20%, class participation – 20%.

Principal textbooks:

1. Acemoglu, D. (2008). Introduction to Modern Economic Growth. Princeton University Press.
2. Borjas, G. (2009). Labor economics. McGraw-Hill Education.
3. Doepke, M., Lehnert, A. and Sellgren, A. (1999). Macroeconomics. UCLA.
4. Jehle, G. and Reny, P. (2011). Advanced Microeconomic Theory, 3rd ed.
5. Krishna, V. (2009). Auction Theory. Elsevier Science.
6. Varian, H. R. (2005) Intermediate microeconomics, 7th ed.

Course outline

Lectures 1 - 2.

Setup of the consumer's maximization problem, properties of consumer demand, duality.

Varian: Chapters 4 – 6, Jehle: Chapters 1.3 – 2.3.

Lecture 3 - 4

The model of labor supply, taxation of labor. Government budget constraint, the Laffer curve.

Doepke: Chapter 13, Borjas: Chapter 2.

Lecture 5

Generalization to the infinite period model. The Bellman equation.

Acemoglu: Chapter 6.

Homework 1

Lecture 6

The model of human capital accumulation.

Borjas: Chapter 7, Acemoglu: Chapter 10.2.

Midterm examination

Lectures 7

Setup of the producer's maximization problem, production costs, duality in production.

Jehle: Chapters 3.2 – 3.5

Lecture 8 - 9

Illustrative examples of the general equilibrium: The endowment economies, equilibrium in production (Jehle, Chapter 5), equilibrium in the labor market (Doepke, Chapter 6), model of trade (Acemoglu, Chapter 19).

Lecture 10 - 11

Overlapping generations model. Social security systems.

Acemoglu: Chapter 9, Doepke: Chapter 12.

Homework 2

Lecture 12 - 13

First and second price sealed-bid auctions. Revenue equivalence theorem.

Krishna: Chapter 1.

Final examination