

## Syllabus

### MICROECONOMICS MSc - 1 year 2019-20

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**Instructors:** Anna Yurko (Part I) Emiliano Catonini (Part II) & Tatiana Mayskaya (Part III)

#### **Course Description:**

This is a yearlong course in Advanced Microeconomics. During the first two modules we study the decisions of individual economic agents, beginning with the theory of consumer choice and the producer theory. We introduce the concept of duality and analyze it in the context of consumption and production decisions. Afterwards, we study decision-making under uncertainty and introduce the expected utility theory. We also discuss its critiques. The first part concludes with the study of competitive equilibrium and its welfare properties in a general equilibrium setting.

The remaining modules can be divided into four subparts: game theory, contract theory, matching theory, and social choice theory. Game-theoretical subpart covers static and dynamic games, both of complete and incomplete information. All other subparts use tools introduced here. Theory of contracts focuses on the principal-agent models with asymmetric information and unobservable actions. As another example of a mechanism design problem, we cover two-sided matching. We end the course by social choice theory that studies preference aggregation rules and their normative appeal.

**Pre-requisites:** Calculus, Probability Theory, Mathematics for Economists.

**Learning Objectives & Outcomes:** At the conclusion of the course, students should be able to:

- use microeconomic models to understand economic decisions of consumers and firms;
- evaluate economic and social outcomes using the concept of Pareto efficiency;
- apply game-theoretic concepts to carry out theoretical research;
- design mechanisms taking into account the asymmetry of information;
- identify and model real life situations where the studied concepts are applicable;
- critically evaluate theoretical research in economics.

**Methods of Instruction:** lectures, seminars, home assignments.

#### **Reading List:**

1. Varian, Hal. *Microeconomic Analysis*, Third Edition, W. W. Norton & Company, Inc, New York, 1992.
2. Andreu Mas-Colell, Michael D. Whinston, Jerry R. Green. *Microeconomic Theory*. Oxford University Press, 1995.
3. Martin J. Osborne and Ariel Rubinstein. *A Course in Game Theory*. MIT Press, 1994.
4. Patrick Bolton and Mathias Dewatripont. *Contract Theory*. MIT Press, 2005.
5. Alvin E. Roth and Marilda A. Oliveira Sotomayor. *Two-sided Matching: A Study in Game-Theoretic Modeling and Analysis*. Cambridge University Press, 1992.
6. Simon, Carl and Lawrence Blume. *Mathematics for Economists*, W. W. Norton & Company, 1994.
7. Kreps, David. *A Course in Microeconomic Theory*, Princeton University Press, Princeton, New Jersey, 1990.

8. Rubinstein, Ariel. Lecture Notes in Microeconomic Theory, Princeton University Press, Princeton and Oxford, <http://arielrubinstein.tau.ac.il/Rubinstein2007.pdf>, 2007

**Special Equipment:** projector, Internet connection, whiteboard.

**Grading System and Examination Type:**

**Final grade =0.5\* [0.61\*(exam winter)+0.29\*(intermediate test 1)+0.05\*(homeworks fall)+0.05\*(class attendance fall)]**

**+0.5\*[0.5\*(exam spring) + 0.2\*(intermediate test 2) + 0.2\*(intermediate test 3) + 0.1\*(homeworks spring)]**

Intermediate test 1 covers consumer and producer theory. Winter exam is comprehensive for the first part of the course. Intermediate test 2 covers material for static games, intermediate test 3 covers dynamic games, exam spring covers only part III of the course.

All grades are given initially out of 100. The final grades are also transferred to 10- and 5-points grades in accordance with the [ICEF Grading Regulations](#) (par. 3).

Retakes are organized in accordance with the [HSE Interim and Ongoing Assessment Regulations](#) (incl. Annex 8 for ICEF). Grade determination after retakes is done in accordance with [ICEF Grading Regulations](#) (par. 5).

Examination is in writing.

Sample materials for knowledge assessment are available in ICEF Information system at <https://icef-info.hse.ru>.

**Course Outline:**

**Part I** [Required readings are marked by an asterisk (\*)]

**1. Consumer Choice Theory**

This chapter studies in detail the individual decisions of consumers. First, we consider individual decision making in an abstract setting: the preference-based vs. the choice-based approach. Then, we focus on the optimal decisions of individual consumers. We derive individual demands and work out their properties. We further discuss the duality of utility maximization and expenditure minimization, study the problem of integrability, and analyze the relation between the earlier results and the choice-based approach. We conclude with the issues of demand aggregation.

Reading:

- Varian, Chapters 7-10.\*
- Mas-Colell, Whinston and Green, Chapters 1-4.\*
- Rubinstein (2006), Lectures 1-6.
- Simon and Blume (1994), Chapters 16-21.

## 2. Producer Theory

This part of the course studies the behavior of the firm and develops a theory parallel to the theory consumption analyzed earlier. We study profit maximization and cost minimization, work out the properties of firm's supply, discuss efficiency in production. The chapter finishes with supply aggregation.

Reading:

- Varian, Chapters 1-6, 13.3.\*
- Mas-Colell, Whinston and Green, Chapter 5.\*
- Rubinstein (2006), Lecture 7.

## 3. Choice Under Uncertainty

We start by learning how to represent risky alternatives by means of lotteries. Then, by imposing rationality, continuity, and independence on individual preferences we obtain a central result known as the expected utility theorem. We analyze the attitude of different individuals towards risk and discuss some classical measures of risk aversion. We then move to comparing alternative distributions of monetary returns in terms of stochastic dominance. We consider the limitations of the expected utility theory and we provide Savage's foundation for subjective expected utility theorem. Violations of Savage axioms lead to a brief discussion of Ellsberg's paradox and ambiguity aversion.

Reading:

- Mas-Colell, Whinston and Green, Chapter 6 (A-D). \*
- Handout on Savage axioms. \*
- Rubinstein (2006), Lectures 8-9.

## 4. General Equilibrium (4 lectures, 2 seminars)

In this part of the course we consider a competitive market economy in a general equilibrium setting. We formally introduce the notions of Pareto optimality and competitive (or Walrasian) equilibrium and analyze their interrelation summarized in the two fundamental theorems of welfare economics. We study in detail the 2 by 2 exchange economy model and the 2 by 2 (two products, two factors) production economy model.

Reading:

- Mas-Colell, Whinston and Green, Chapters 15 (A-D), 16 ©, 17 (A-B), 19 (A-D). \*

**Part II** Each lecture or seminar lasts 2 academic hours. Each lecture must be followed by 5 hours of self-study, of which 3 to do a problem set, which will be solved in class at the following seminar.

1. Lecture on dominance and rationalizability
2. Seminar on dominance and rationalizability + Lecture on Nash equilibrium
3. Seminar on Nash equilibrium (oligopoly) + Lecture on incomplete information games
4. Seminar on incomplete information games (auctions) + Revision lecture
5. INTERMEDIATE TEST 1 + Lecture on dynamic games
6. Seminar on dynamic games (bargaining) + Lecture on repeated games

7. Seminar on repeated games (collusion) + Lecture on dynamic games with incomplete information
8. Seminar on cheap talk/signaling/persuasion games + Revision lecture
9. INTERMEDIATE TEST 2

**Part III**

1. Contract theory (12 hours lecture, 4 hours seminar, 10 hours self-study)
  - a. hidden information: screening
  - b. hidden action: moral hazard
2. Matching theory (6 hours lecture, 2 hours seminar, 8 hours self-study)
  - a. deferred acceptance algorithm
  - b. lattice structure of stable matchings
  - c. strategy-proofness: impossibility result
3. Social choice theory (6 hours lecture, 2 hours seminar, 6 hours self-study)
  - a. Arrow impossibility theorem
  - b. restricted domain: single-peaked preferences and median voter theorem

**Summary table:**

	Topic	Total hours	Contact hours		Self-study
			Lectures	Seminars	
1	Consumer Choice Theory	36	10	6	20
2	Producer Theory	20	6	2	12
3	Choice under Uncertainty	27	8	4	15
4	General Equilibrium	27	8	4	15
5	Dominance and rationalizability	9	2	2	5
6	Nash equilibrium	9	2	2	5
7	Incomplete information games	9	2	2	5
8	Dynamic games	9	2	2	5
9	Repeated games	9	2	2	5
10	Cheap-talk, signaling, persuasion games	9	2	2	5
11	Contract Theory	26	12	4	10
12	Matching Theory	16	6	2	8
13	Social choice Theory	14	6	2	6
	Total	220	68	36	116