Masaryk University – Brno

Department of Mathematics and Statistics – Faculty of Science

Kotlářská 2, Building 08, Brno

Mathematical Models in Economics

Syllabus - Spring Semester 2011

Instructor:	Georgi Burlakov
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Language of Instruction:	English
Teaching Schedule:	Room M3, Thursday, 14:00-16:50
Office Hours:	room and time, TBA
Semester:	21.02.2011 – 20.05.2011
Exam Period:	23.05.2011 – 01.07.2011

Course Description: The course presents some of the most avant-garde mathematical tools used in the modern economic analysis. It provides introduction to Game Theory, as a branch of Applied Mathematics, by answering the question how it is used in today's Economics.

Learning Strategy: During the lectures students get familiar with basic economic terms and concepts using their own real-life intuition about the market relations between buyers and sellers. Therefore, they are not required to have in advance some special knowledge in the fields of philosophy or history of economic science. To pass successfully, during the course students should develop and demonstrate ability to identify the key characteristics of a particular market situation, to relate it to one of the main standard models studied in class and to apply that model to find the correct market equilibrium solution (i.e. the optimal set(s) of possible decisions of the parties actively engaged in the market) according to the theory.

Grading: The overall course grade will be computed by converting into a grade-point score the total number of points gained from participation in class (10%), doing two homework assignments (10%), midterm (30%) written exam and final (50%) written exam.

Teaching Strategy: The course is taught in English and is set on specialized foreign literature sources which might not be generally available in the university bookstore or library. However, students are not required to use the original textbooks to prepare for the course. Instead, after each lecture they will be provided with handouts and slide presentations containing all the basic knowledge which needs to be mastered for successful performance on the homework assignments and the exam.

1. Course Outline:

Week	Hours	Topic
24.02.2011	Slot 1 (3 hours)	1.1. Static Games of Complete Information
03.03.2011	Slot 2 (3 hours)	1.2. Economic Application: Cournot versus Bertrand Model of Duopoly
10.03.2011	Slot 1 (3 hours)	2.1. Dynamic Games of Complete and Perfect Information
17.03.2011	Slot 2 (3 hours)	2.2. Economic Application: Stackelberg Model of Duopoly
24.03.2011	Slot 1 (3 hours)	2.3. Dynamic Games of Complete but Imperfect Information (**HW 1 due**)
31.03.2011	Slot 2 (3 hours)	2.4. Economic Application: Bank Runs, Imperfect International Competition
07.04.2011	Slot 1 (2 hours)	2.5. Repeated Games (+1 hour **MIDTERM EXAM**)
14.04.2011	Slot 2 (3 hours)	2.6. Economic Application: Collusion between Cournot Duopolists
21.04.2011	Slot 1 (3 hours)	3.1. Static Games of Incomplete Information
28.04.2011	Slot 2 (3 hours)	3.2. Economic Application: First and Second-bid Auctions
05.05.2011	Slot 1 (3 hours)	4.1. Dynamic Games of Incomplete Information (**HW 2 due**)
12.05.2011	Slot 2 (3 hours)	4.2. Economic Application: Signaling and Screening, Cheap Talk
19.05.2011	Slot 1 (1 hour)	5.1. Refinements of Perfect Bayesian Equilibrium (+2 hours **FINAL EXAM**)

Literature:

1. Gibbons R., Game Theory for Applied Economists, Princeton University Press, 1992.
2. Laffont, J. and Martimort, D., The Theory of Incentives - The Principal Agent Model, Princeton University Press, 2002.
3. Schotter, A., Microeconomics: A Modern approach, South-Western Cengage Learning, 2009.
4. Varian H., Intermediate Microeconomics: A Modern Approach, 6th ed., W. W. Norton & Company, 2003.