Masaryk University – Brno

Faculty of Science

M9302 Mathematical Models in Economics

Syllabus – Spring Semester 2010

Instructor: Georgi Burlakov (http://home.cerge-ei.cz/georgi)
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Language of instruction: English
Teaching period: 22.02.2010 – 21.05.2010
Place: Lecture Room M3, Kotlářská 267/2, 611 37 Brno

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 three homework assignments (30%) and a written exam (70%).

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.

Literature:

1. Gibbons R., Game Theory for Applied Economists, Princeton University Press, 1992.
2. Hirshleifer, J. and Riley, J., The Analytics of Uncertainty and Information. Cambridge University Press 1997.
3. Laffont, J. and Martimort, D., The Theory of Incentives - The Principal Agent Model, Princeton University Press, 2002.
4. Varian H., Intermediate Microeconomics: A Modern Approach, 6th ed., W. W. Norton & Company, 2003.

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Course Outline:

Day	Hours	Topic
26.02.2010	10:00-11:50 a.m.	1.1. Static Games of Complete Information
	02:00-03:50 p.m.	1.2. Economic Application: Cournot versus Bertrand Model of Duopoly
12.03.2010	10:00-11:50 a.m.	2.1. Dynamic Games of Complete and Perfect Information
	02:00-03:50 p.m.	2.2. Economic Application: Stackelberg Model of Duopoly
26.03.2010	10:00-11:50 a.m.	3.1. Dynamic Games of Complete but Imperfect Information
	02:00-03:50 p.m.	3.2. Economic Application: Bank Runs, Imperfect International Competition
9.04.2010	10:00-11:50 a.m.	4.1. Repeated Games
	02:00-03:50 p.m.	4.2. Economic Application: Collusion between Cournot Duopolists
23.04.2010	10:00-11:50 a.m.	5.1. Information Theory
	02:00-03:50 p.m.	5.2. Economics Application: Principal-Agent Problem
7.05.2010	10:00-11:50 a.m.	6.1. Static Games of Incomplete Information
	02:00-03:50 p.m.	6.2. Economic Application: First and Second-bid Auctions
21.05.2010	10:00-11:50 a.m.	7.1. Dynamic Games of Incomplete Information
	02:00-03:50 p.m.	7.2. Economic Application: Signaling and Screening, Cheap Talk