Academic subject: Mathematical models for Economics				
Degree Class: L - 35		**Degree Course:** Mathematics	**Academic Year:** 2018/2019	
		Kind of class: optional	**Year:** 3	**Period:** 2
			ECTS: 7 divided into **ECTS lessons:** 6,5 **ECTS exe:** 0,5	

Time management, hours, in–class study hours, out–of–class study hours
lesson: 52   exe/lab/tutor: 8   in–class study: 60   out–of–class study: 115

Language: Italian	**Compulsory Attendance:** no		
Subject Teacher: Mario Sportelli	**Tel:** +39 0805442683 **e–mail:** mario.sportelli@uniba.it	**Office:** Department of Mathematics Room 3, Floor III	**Office days and hours:** Wednesday 9.00 – 11.00. Other days and time by appointment.

Prerequisites: Mathematical knowledges usually acquired during the first two years of a degree of L-35 class. Especially: classical analysis of one and several variables, matrix algebra.

Educational objectives: Acquiring language and mathematical techniques applied to the basic microeconomic analysis.

Expected learning outcomes (according to Dublin Descriptors)	**Knowledge and understanding:** Acquiring fundamental concepts in the mathematical treatment of the basic economic theory. **Applying knowledge and understanding:** The acquired theoretical knowledge will be useful to model and interpret microeconomic phenomena. **Making judgements:** Ability to analyze microeconomic problems and to formalize solutions consistent with the theoretical knowledges. **Communication:** Students should acquire the mathematical language and formalism necessary to read and comprehend textbooks and to explain microeconomic phenomena.

Lifelong learning skills:
Acquiring suitable learning methods, supported by text consultation and by reading papers and articles dealing with microeconomic arguments.

Course program

1. Basic elements of choice theory: The object of economic theory: economic agents and economic system. Consumer behavior: the consumption set and the theory of preferences; the existence of a utility function. The utility maximization problem; the Marshallian demand function. The indirect utility function and the expenditure function. The Hicksian demand function. The Slutsky equation. Properties of demand functions. The money matric utility function. The integrability problem. Consumer surplus. Endowments in the budget constraint: the net demand for goods. The extended Slutsky equations.
Production: Technology: short run and long run; production function; total, average and marginal productivity; returns to scale. Profit maximization and cost minimization: conditional factor demand functions. Cost

functions: total, average and marginal cost. Minimal efficient scale. Shephard's lemma.
Uncertainty: expected utility function. Risk aversion. A simple portfolio problem.

2. Basic elements of markets: Competitive markets: the firm supply function and the industry supply function; short run and long run equilibria. Producer surplus. Welfare analysis. Monopoly: welfare and output. Price discrimination. Oligopoly: strategic behavior and classification models. The Cournot and Bertrand models. The Stackelberg model. The price leadership. Collusion: short run instability and long run stability.

3. General equilibrium and welfare: The Walras general equilibrium problem. The exchange economy. The Edgeworth approach. The Pareto set. Walras' law. The existence and uniqueness of a general equilibrium. Theorems of the welfare economy.

Teaching methods:
Lectures and exercise sessions.

Auxiliary teaching:
Didactic material assigned during the course.

Assessment methods:
Written and oral exam

Bibliography:
For all the arguments treated in the course, the teacher will provide the students with a set of lecture notes.