

# Detailed Syllabus – Microeconomics 1 (7 credits)

## Masters M1 QEM, IMMAEF & DU MMEF – First Semester 2020/2021

**Part A - Individual Decision Making**

**Part B - Equilibria & Optimality**

**Teachers:** Elena del Mercato & Antoine Mandel

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**Duration:** 12 weeks

**Mode of evaluation:** The final grade is given in the form of a mark between 0 and 100. This mark is given by the attendance, and the results of an intermediate examination and the final exam.

**Final Exam:** Wednesday, December 7, 2020 from 13:00 to 15:00

### Course Content

#### Part A - Individual Decision Making

**- Rational Behavior, Choice, and Market Demand.** Consumption set, preferences, properties of preferences, utility representation, properties of utility functions, examples. Choice rules and the weak axiom of revealed preference. Budget constraint, utility maximization problem, competitive demand, properties and computation on some examples. Differential characterization of the demand for a differentiable utility function. Expected utility theory and risk aversion.

**- Production and Firm Behavior.** Production set, transformation function, production function, examples. Competitive behavior, profit maximization, profit function, supply function, properties. Differential characterization of the supply for a differentiable transformation function. Cost minimization, cost function, demand function, properties. Relationship between profit maximization and cost minimization.

#### Part B - Equilibria & Optimality

**- Pure exchange: the Edgeworth box.** Definitions of competitive equilibrium and Pareto optimality in the Edgeworth box. Computation and geometric characterization of equilibria and Pareto optima in the Edgeworth box.

**- Production economies.** Private ownership economies, definition of competitive equilibrium. Basic properties: Walras's Law and price normalization. Computation of competitive equilibria. Notions of feasible allocations and Pareto optimal allocations in a production economy. Pareto optimality conditions in terms of marginal rates of substitution and marginal rates of transformation. First and Second theorems of welfare economics.

### References

- Mas-Colell, A., Whinston, M.D., Green, J., (MWG) *Microeconomic Theory*, Oxford University Press, 1995. Chapters 1-6, 10 and 15-16.
- Bonnisseau, J.-M., del Mercato E., *Class Notes: Microeconomics 1*, 2019.
- del Mercato, E., *Mathematical Appendix for Economics*, 2019.

### **Week 1 (MWG 1A, 1B, 2A, 2B, 2C, 3B)**

Presentation of the course (outlines of the program, references) – Notations – Commodities – Consumer Theory: consumption bundle, consumption set, preference relation, examples of preference relations (linear, Leontief, Lexicographic preferences), indifference curves, upper/lower contour sets – Basic properties of preferences: monotonicity, continuity, convexity.

### **Week 2 (MWG 2D, 3C, 3D)**

Utility function, existence of a representation (only statement and remarks), examples of utility functions (linear, Leontief, Cobb-Douglas utility functions), basic properties of utility functions: monotonicity, continuity, differentiability, quasi-concavity. Prices, budget constraint, examples and basic properties – Utility Maximization Problem (UMP), Walrasian demand correspondence – Basic properties of the Walrasian demand: well defined, homogeneity of degree zero, Walras's Law.

### **Week 3 (MWG 3D, 1C, 1D, 2F up to page 30)**

Characterization of the Walrasian demand in terms of first order conditions (FOC) and geometric interpretation – Characterization of the Walrasian demand in terms of Marginal Rates of Substitution (MRS). Choice rules – The relationship between preference relations and choice rules – The weak axiom of revealed preference.

### **Week 4 (MWG 6A, 6B)**

Expected Utility Theory – Lotteries, preferences over lotteries, von Neumann-Morgenstern expected utility function – Expected utility theorem (only statement, interpretation and remarks).

### **Week 5 (MWG 6B, 6C up to page 190)**

Paradoxes of expected utility theory – Notion of risk aversion – Characterization of risk aversion with a Bernoulli utility function – Arrow-Pratt coefficient of risk aversion.

### **Week 6 (MWG 5A, 5B)**

Producer Theory: production plans (inputs/outputs), production set, transformation function (several outputs), production function (a single-output), examples – Basic properties of a production set: non-emptiness, closedness, possibility of inaction, impossibility of free-production, free-disposal, irreversibility, convexity, increasing/decreasing/constant returns to scale).

### **Week 7 (MWG 5C)**

Profit Maximization Problem (PMP), iso-profit lines, supply correspondence, profit function – Characterization of the supply in terms of first order conditions (FOC) and interpretation in terms of Marginal Rates of Transformation (MRT) and marginal rates of technical substitution (MRTS) – Basic properties of the supply and the profit function – The law of supply and its proof.

### **Week 8 (MWG 5C, 5G)**

Cost Minimization Problem (CMP), isoquant, cost function, demand of inputs – Basic properties of the demand of inputs and the cost function – Characterization of the demand of inputs in terms of first order conditions (FOC) – Relationship between the profit maximization and the cost minimization problems – Relationship between the supply and the demand of inputs in terms of derivatives of the cost function (Shepard's Lemma) – Remarks on the objectives of the firm.

### **Week 9 (MWG 15A, 15B, 10B)**

Pure Exchange: the Edgeworth box – Competitive equilibrium and Pareto optimality in the Edgeworth box. Geometric characterization of equilibria and Pareto optima in the Edgeworth box. Pareto optimality and competitive equilibria in a general setting: definitions and their interpretation – Walras's Law, price normalization and computation.

### **Week 10 (MWG 15C, 16E, 16F)**

The one-consumer, one-producer economy – Pareto optimality and social welfare functions – Characterization of Pareto optimal allocations in terms of the maximization problem of one consumer under appropriate constraints – Characterization of Pareto optimal allocations in terms of marginal rates of substitution and marginal rates of transformation.

### **Week 11 (MWG 16C, 16D)**

The First theorem of welfare economics and its proof.

The Second theorem of welfare economics: only statement, interpretation, examples and remarks.

Open questions and clarifications before the Final Exam.

### **Week 12**

**Final Exam: Wednesday, December 7, 2020 from 13:00 to 15:00**