Microeconomics 1

Course: 48 hours – TD: 36 hours

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Office Hours: Monday 13:00-15:00, Office 518 - MSE.
Class: Every Monday 10:00-11:30 (TD), 15:30-17:30 (Course), and Wednesday 9:30-11:00 (TD), 11:00-13:00 (Course), Room 117 in MSE.

References

- Mas-Colell, A., Whinston, M.D., Green, J., *Microeconomic Theory*, Oxford University Press, 1995. Chapters 1-5, 10 and 15-17.
- Bonnisseau, J.-M., del Mercato E.L., *Class Notes: Microeconomis 1*, 2014.
- del Mercato, E.L., *Mathematical Appendix for Economics*, 2014.

Course Description

General Presentation: The course deals with individual decision making by consumers and producers, and competitive equilibria and Pareto optimal allocations in pure exchange economies and in production economies.

Course Content

- Consumers. Consumption set, preferences, properties of preferences, utility representation, properties of utility functions, examples. Budget constraint, utility maximization problem, competitive demand, properties and computation on some examples. Differential characterization of the demand for a differentiable utility function.
- Producers. 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.
- Pure exchange economies. Definition of competitive equilibrium, properties. An example with two commodities-two consumers: the Edgeworth box. Differential characterization of competitive equilibria. Existence of competitive equilibria. Feasible allocations, Pareto optimal allocations. Existence of Pareto optimal allocations. Differential characterization of Pareto optimal allocations. Pareto optimality conditions in terms of marginal rates of substitution. First and second theorems of welfare economics.
- Production economies. Private ownership economies, definition of competitive equilibrium, properties. Differential characterization of competitive equilibria. Existence of competitive equilibria. Production economies, feasible allocations, Pareto optimal allocations. Existence of Pareto optimal allocations. Differential characterization of Pareto optimal allocations. Pareto optimality conditions in terms of marginal rates of substitution and marginal rates of transformation. First and second theorems of welfare economics.

Detailed Syllabus – Course

Part A: Individual Decision Making (September 15 - October 22): 24 hours

Class 1
Presentation of the course (outlines of the program, references) – Notations – Commodities – Consumer Theory: consumption bundle, consumption set, preference relation, examples (linear preferences, Leontief preferences), indifference curves, lower / upper contour sets.

Class 2
Consumer Theory: basic properties of preferences (monotonicity, continuity, convexity) – Utility function, existence of a representation, examples (linear, Leontief, Cobb-Douglas utility functions), basic properties of utility functions (monotonicity, continuity, differentiability, quasi-concavity).

Class 3
Prices – Consumer Theory: budget constraint, examples and basic properties – Utility Maximization Problem (UMP), demand correspondence, an example with infinitely many solutions (i.e., linear utility functions) – Basic properties of the demand: existence and uniqueness of a solution, demand function.

Class 4
Consumer Theory: Walras' law – Characterization of the demand in terms of First Order Conditions (F.O.C.), geometric interpretation – Characterization of the demand in terms of Marginal Rates of Substitution (M.R.S.), analytical interpretation.

Class 5
Producer Theory: production plans (inputs/outputs), production set, transformation function, production function, 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).

Class 6
Producer Theory: Profit Maximization Problem (PMP), iso-profit lines, supply correspondence, profit function – An example with infinitely many solutions (i.e., constant returns to scale). Basic properties of the supply: uniqueness of a solution, supply function.

Class 7
Producer Theory: Basic properties of the supply: existence of a solution. Characterization of the supply in terms of First Order Conditions (FOC), geometric interpretation – Characterization of the supply in terms of Marginal Rates of Transformation (MRT), analytical interpretation.

Class 8
Producer Theory: Additional properties of the supply correspondence and the profit function – The law of supply. Cost Minimization Problem (CMP), isoquant, cost function, demand of inputs.

Class 9
Producer Theory: Basic properties of the demand of inputs (existence and uniqueness of a solution) – Characterization of the demand of inputs in terms of First Order Conditions (FOC), geometric interpretation.

Class 10
Producer Theory: Relationship between profit maximization and cost minimization problems, proof – Relationship between supply and demand of inputs in terms of derivatives of the cost function, proof.

Class 11
Clarifications, examples and remarks before the Midterm Exam.

Class 12 : Midterm Exam

Part B: Equilibria & Optimality (November 3 - December 10)): 24 hours

Class 13
Pure exchange economies: allocations, feasible allocations, basic properties of the set of feasible allocations (non-emptiness, closedness, boundedness, convexity) – The Edgeworth box – Notion of competitive equilibrium and its basic properties.

Class 14
Pure exchange economies. Additional properties of competitive equilibria (Walras Law) – Characterization of competitive equilibria in terms of First Order Conditions (FOC) and Market Clearing Conditions (MCC) – Characterization of competitive equilibria in terms of Marginal Rates of Substitution and Market Clearing Conditions.

Class 15
Pure exchange economies. Two theorems on the existence of competitive equilibria: statements and comments – Notion of Pareto optimal allocation – Pareto optimal allocations in the Edgeworth box: the contract curve.

Class 16
Pure exchange economies. Characterization of Pareto optimal allocations in terms of the maximization problem of one consumer under constraints – Characterization of Pareto optimal allocations in terms of First Order Conditions (FOC) – Characterization of Pareto optimal allocations in terms of Marginal Rates of Substitution.

Class 17
Pure exchange economies. First and Second Welfare Theorems: Proofs and applications. Private ownership economies: definition. Allocations and feasible allocations.

Class 18
Private ownership economies. Competitive equilibrium and its basic properties – Characterization of competitive equilibria in terms of First Order Conditions (FOC) and Market Clearing Conditions (MCC) – Characterization of competitive equilibria in terms of Marginal Rates of Substitution, Marginal Rates of Transformation and Market Clearing Conditions.

Class 19
Production economies. Notion of Pareto optimal allocation – Characterization of Pareto optimal allocations in terms of the maximization problem of one consumer under constraints – Characterization of Pareto optimal allocations in terms of First Order Conditions (FOC).

Class 20
Production economies. Characterization of Pareto optimal allocations in terms of Marginal Rates of Substitution and Marginal Rates of Transformation – Existence of Pareto optimal allocations with proof – First and Second Welfare Theorems: statements and comments.

Class 21
The one-consumer, one-producer economy (Session 15.C in *Microeconomic Theory,* Mas-Colell, Whinston and Green).

Class 22
Clarifications, examples and remarks before the Final Exam.

Class 23: Final Exam

Class 24
Production economies. Sufficient conditions for the compactness of the set of feasible allocations: comments and counterexamples – Existence of Pareto optimal allocations: Proof – Pareto optimality in terms of the maximization of an appropriate welfare function with weights.