

Sapienza University of Rome Faculty of Economics

Department of Economics and Law

Academic year 2023-2024 (I Semester)

SYLLABUS FOR THE CRASH COURSES

MATHEMATICS PREPARATORY COURSE

1. Functions and Their Graphs
2. Some Important Functions
3. The Algebra of Functions
4. The Slope of a Straight Line
5. The Derivative and Limits
6. Differentiability and Continuity
7. Some Rules for Differentiation
8. Describing Graphs of Functions
9. The First- and Second-Derivative Rules
10. The First- and Second-Derivative Tests and Curve Sketching
11. The Definite and Indefinite Integral
12. Examples of Functions of Several Variables
13. Partial Derivatives
14. Maxima and Minima of Functions of Several Variables
15. Lagrange Multipliers and Constrained Optimization

STATISTICS PREPARATORY COURSE

1. Probability in our daily lives
2. Probability distributions
3. Sampling distributions
4. Statistical Inference: Confidence Intervals
5. Statistical Inference: Significance Tests About Hypothesis

Textbook: A. Agresti, C. Franklin, B. Klingenberg (4th edition). Statistics: the art and science of learning from data. Chapters: 5, 6, 7, 8, 9.

MICROECONOMICS PREPARATORY COURSE

Course objectives

This is an introductory course to the graduate Microeconomics course. Its main objective is to anticipate some of the key topics of the graduate course and provide some analytical background (mathematical groundings).

Syllabus

- I. Introduction to neoclassical microeconomics: key concepts and analytical methodologies
- II. Consumer theory Ordering of preferences and the feasible set The consumer's problem and the consumption decision Comparative statics and demand curves Duality
- III. Production theory The production function Variations in scale and in input proportions Cost minimization in the long- and in the short-run Profit maximization in the long- and in the short-run
- IV. Partial equilibrium The short-run equilibrium The long-run equilibrium
- V. General equilibrium Existence and optimality (brief mention) Specific attention will be devoted to the mathematical tools (optimization).

Textbook Microeconomics, Hugh Gravelle and Ray Rees, 3rd ed., Pearson education Limited, 2004.

MICROECONOMICS PREPARATORY COURSE

Syllabus

- I. Introduction and key concepts
- II. The short run Goods Markets Financial Markets I Goods and Financial Markets:
The IS-LM Model
- III. The medium run Labour Market Phillips Curve, NAIRU, Inflation The IS-LM-PC
Model
- IV. The long run The facts of growth Saving, Capital Accumulation and Output
Technological Progress and Growth

Textbook Macroeconomics, Olivier Blanchard (2020), Pearson, 8th Edition. (Chapters 3-13)