Freshup Course

Introduction

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- This course briefly recapitulates the required knowledge from Bachelor education in mathematics, micro- and macroeconomics which are essential for the master courses. In addition, some instructions and exercises regarding academic writing are provided.
- The are several functions of the course:
  - *Voluntary* freshup of your Bachelor knowledge and skills.
  - *Compulsory* course in case of a *conditional admission* to the master program.
  - Teachers do not need to recapitulate Bachelor stuff within master course lectures but can refer to the particular parts of the freshup course.
- Each part consists of a series of short videos and Moodle quizzes.
- In case that you do this course as a compulsory requirement, there will be an exam at the end of the winter semester. In case of fail, the exam can be repeated once.

Part I: Mathematics

Chiang, A., Wainwright, K. (2005), *Fundamental Methods of Mathematical Economics*, 4. ed., McGraw-Hill: New York.

Part II: Microeconomics

Varian, H. (2021), *Intermediate Microeconomics*, 9. ed, Norton.

Part III: Macroeconomics

Blanchard, O. (2020), *Macroeconomics*, 8. ed., Pearson.

Part IV: Academic Writing

Part I: Mathematics

1. Basic Operations, Series and Sequences
2. Linear Algebra
   - 2.1 Vectors and Matrices
   - 2.2 Determinant, Inverse and Eigenvalues
   - 2.3 Solving Linear Systems
3. Analysis
   - 3.1 Functions and Derivatives
   - 3.2 Total Derivatives and Taylor Approximation
   - 3.3 Concavity and Convexity
   - 3.4 Lagrange Optimization
   - 3.5 Integrals
4. Difference Equations
   - 4.1 Linear Difference Equations
   - 4.2 Intertemporal Optimization

Part II: Microeconomics

1. Theory of Firm
   - 1.1 Production functions
   - 1.2 Cost Minimization and Cost Function
   - 1.3 Profit Maximization and Supply
   - 1.4 Factor Demand
2. Theory of Household
   - 2.1 Representation of Preferences
   - 2.2 Household Optimum and Demand Function
   - 2.3 Elasticity and Homotheticity
   - 2.4 Income and Substitution Effect
   - 2.5 Labor Supply
   - 2.6 Intertemporal Consumption and Saving Decision

3. Markets
   - 3.1 Perfect Competition
   - 3.2 Monopoly
   - 3.3 Monopolistic Competition
   - 3.4 Oligopoly
4. Efficiency and Welfare
   - 4.1 Transformation Curve and Technical Efficiency
   - 4.2 Edgeworth Box and Pareto Efficiency
   - 4.3 Consumer and Producer Surplus
   - 4.4 Market Failure and Inefficiencies
     - Market Power
     - Externalities
     - Information Asymmetries

Part III: Macroeconomics

1. Describing Economic States
   - 1.1 Nominal and Real GDP
   - 1.2 Balance of Payments
   - 1.3 Inflation Measurement
   - 1.4 Unemployment
2. Short Run
   - 2.1 Private Consumption
   - 2.2 Fisher Equation and Investment Demand
   - 2.3 Fiscal Policy
   - 2.4 IS Curve
   - 2.5 Money Supply and Money Demand
   - 2.6 Monetary Policy and LM Curve
   - 2.7 Comparative Static Analysis (IS-LM)

3. Medium Run
   - 3.1 Wage/Price Setting and the Phillips Curve
   - 3.2 Monetary Policy Rules and Comparative Static Analysis (IS-LM-PC)
4. Open Economy
   - 4.1 Exports and Imports
   - 4.2 Exchange Rate Determination
   - 4.3 IS-LM model for an Open Economy (Mundell-Fleming model)
5. Long Run: Solow Growth Model

Part IV: Academic Writing

1. Literature Search
2. Research question and structure
3. Writing style
4. Plagiarism and Citation
5. Formatting guidelines and formalities
6. The role of AI / chatGPT

Addendum: Methodological preliminaries

Final remark:

- A further chapter about **Statistics** might be added in the future.
- We expect a broader education in economics which might include also fields such like *Public Finance*, *Economic Policy*, *International Trade* and so on. But all these fields are to some extent based on micro- and macroeconomics. Therefore we insist on a sound education in these core fields.