

MA Applied Economics — Recommended Background in Macroeconomics, Microeconomics, Mathematics, and Statistics

This note describes the minimum background recommended for the MA Applied Economics. Students are advised to familiarise themselves with the concepts listed below before getting started with the programme.

The following textbooks, for example, provide good introductions to these topics:

- Macroeconomics: Mankiw and Taylor (2006). *Economics*, Thomson (MT)
- Microeconomics: Frank (2024). *Microeconomics and Behavior*, McGraw Hill (F)
- Mathematics: Simon and Blume (1994). *Mathematics for Economists*, W.W. Norton (SM)
- Statistics: Newbold, Carlson and Thorne (2013). *Statistics for Business and Economics*, Pearson (NCT)

Macroeconomics

I. National accounts

- Value added
- GDP and its components
- Nominal and real variables

MT: chapters 23 and 24

II. The real economy in the long run

- Economic growth
- Productivity
- Saving, investment and the financial system
- Unemployment
- Money and prices

MT: chapters 25-30

III. Open Economy

- Balance of payments
- Current account
- Nominal and real exchange rates
- Flexible and fixed exchange rates

MT: chapters 31 and 32

IV. Short-run economic fluctuations

- Aggregate demand
- Aggregate supply
- Monetary and fiscal policy
- Inflation and unemployment

MT: chapters 33-35

Microeconomics

I. Supply and demand

- Utility maximisation
- Demand
- Income and substitution effect
- Elasticity

F: chapters 3-6

II. Producer theory

- Profit maximisation
- Supply
- Cost minimisation
- Factor demand

F: chapters 8 and 9

III. Perfect competition

- Equilibrium
- Pareto efficiency
- Comparative statics

F: chapter 10

IV. Imperfect competition

- Monopoly
- Strategic behaviour
- Oligopoly
- Monopolistic competition

F: chapters 11-13

Mathematics

I. Linear Algebra

- Systems of linear equations
- Vectors, matrices, determinants
- Matrix algebra
- Linear independence

SB: chapters 6-11

II. Calculus

- Functions of one variable
- Derivatives
- Taylor approximations
- Functions of many variables
- Partial derivatives

SB: chapters 3-5 and 12-16

III. Optimisation

- Unconstrained optimisation in \mathbb{R}^1 and \mathbb{R}^n
- Constrained optimisation (with equality constraints)

SB: chapters 3, 17-19

Statistics

I. Descriptive Statistics

- Measures of centrality
- Percentiles
- Measures of dispersion
- Bell curve
- Covariance and correlation

NCT: chapters 1 and 2

II. Probability

- Definition of probability
- Probability of union and intersection of events
- Joint and marginal probability

- Conditional probability
- Bayes theorem

NCT: chapter 3

III. Random variables

- Discrete random variables, probability and cumulative probability functions
- Bernoulli and binomial distributions
- Continuous random variables, density and cumulative probability functions
- Normal distribution
- Random samples and sampling distributions
- Central limit theorem and law of large numbers

NCT: chapters 4-6

IV. Inference

- Point estimators
- Unbiasedness, efficiency
- Confidence intervals
- Student's t
- Hypothesis tests
- Type I and type II errors

NCT: chapters 7-10