

# Mathematics 0 – Syllabus (10 weeks)

## Course Goals

This preparatory course is designed for first-year economics students to review and reinforce essential secondary-school mathematics. The course provides a strong foundation for university-level quantitative subjects.

## Structure

- Duration: 10 weeks (9 instructional weeks + 1 revision week)
- Sessions: 100 minutes weekly (seminar)
- Language of instruction: English

## Weekly Topics

### Week 1: Algebraic expressions and basic equations

- Simplifying powers, roots, and rational expressions
- Factoring, expanding, and algebraic manipulation
- Linear and basic quadratic equations

### Week 2: Absolute value and inequalities

- Properties and graphs of absolute value functions
- Linear and quadratic inequalities
- Absolute value equations and their geometric meaning

### Week 3: Rational expressions and equations

- Domain restrictions, simplifying rational expressions
- Solving equations and inequalities with rational terms

### Week 4: Radical expressions and equations

- Simplifying and manipulating roots and powers
- Solving radical equations and interpreting solutions

### Week 5: Functions I – polynomials and power functions

- Definitions and properties of functions
- Linear, quadratic and higher-order polynomial functions
- Domain, range, and basic graphing

**Week 6: Functions II – exponential and logarithmic functions**

- Exponential growth and decay
- Logarithms: definition, rules, and applications
- Graphs and transformations

**Week 7: Equations with exponents and logarithms**

- Solving exponential and logarithmic equations and inequalities
- Applications and nested expressions

**Week 8: Composite and inverse functions; graph transformations**

- Function composition and inverse functions
- Shifts, reflections, stretching/compressing of graphs

**Week 9: Piecewise functions and mixed review**

- Graphs and interpretation of piecewise-defined functions
- Review of challenging types of problems
- Preparation for the final practice test

**Week 10: Final review and practice test**

- Simulated final test with group discussion
- Summary of key concepts and student feedback

**Assessment**

A final test