



# Mathematics for economists

Summer bridge course for ICEF MSc students 2022

Lecturer: Daniil Esaulov

## Course description:

This short course provides the coverage of fundamental topics in Linear Algebra, Calculus and Methods of Optimization.

The topics covered in this course will enable the students to develop the theoretical knowledge and practical skills required for more profound understanding of economic and econometric modelling.

The course is taught in English.

**Prerequisites** for the course is one-variable calculus

## Methods of instruction:

The following methods and forms of study are used in the course:

- lectures
- self-study with literature

## Types of assessment:

- Final exam (at the end of the course)

## Required reading list:

- C.P. Simon and L. Blume, *Mathematics for Economists*, W.W. Norton and Co, 1994
- (**SB**) • A.C. Chiang. *Fundamental Methods of Mathematical Economics*, McGraw-Hill, 2008 (**C**)
- H. Anton and C. Rorres, *Elementary Linear Algebra: Applications version*, 11th Edition, John Wiley and Sons, 2014 (**AR**) **Course outline:**

### 1. Elements of Linear Algebra

- Systems of linear equations, matrix algebra, determinants
- Linear vector spaces, eigenvalues and eigenvectors, diagonalization
- Quadratic forms

**AR, Ch. 1,2,5,7; SB, Ch. 7-9**

## **2. Elements of Calculus**

- Calculus of several variables: directional derivatives, gradient, chain rule ·  
Unconstrained optimization and equality constraint optimization
- Complex numbers
- Differential equations and systems of differential equations, stability **SB**,

**Ch. 14-18, 24-25; C, parts 4-5**