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**CCA**

Allievi Program, Master in Economics, and Ph.D. in Economics

# MATHEMATICS FOR ECONOMICS

## Fall 2023

Instructor: Pierpaolo De Blasi

### Contact Information

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### Course Description

The purpose of this course is to provide basic mathematical tools used in macro and microeconomics. Knowledge of elementary calculus is assumed. The main topic is linear algebra, see below for a detailed course outline. Each topic is complemented with a problem set; some of the exercises will be solved in class; solutions will be available via a Google Drive Folder in due time. It is highly recommended to try to solve the exercises prior to looking at the solutions. Attendance to classes is *mandatory*.

### Schedule

The course will take place during the last week of August and the first two weeks of September, 10 classes of 3 hours each, for a total of 30 hours.

### Exam

There will be a final examination during the third week of September, consisting of a series of problems to be solved in 3 hours time. No lecture material will be allowed (closed-book exam).

## Textbooks

The main texts for the course are:

**(SB)** Simon, C. P. and Blum L. (1994). *Mathematics for Economists*. W. W. Norton & Company.

**(S)** Strang, G. (2009). *Introduction to Linear Algebra* (4 edn). Wellesley Cambridge Press.

In addition, I will post in due time the lecture notes via a Google Drive Folder. The shareable link will be provided via email. They are for internal use only.

## Course Outline

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|---|---|
| 1. Elements of vector and matrix algebra        | <b>(S)</b> Chp 1–2<br><b>(SB)</b> 10.1–10.4, 8.1–8.4              |
| 2. System of linear equations                   | <b>(S)</b> Chp 2<br><b>(SB)</b> 7.1–7.3, 8.7                      |
| 3. Vector spaces, linear independence and basis | <b>(S)</b> Chp 3, Chp 4<br><b>(SB)</b> 11.1–11.3, 27.1–27.2, 27.6 |
| 4. Rank and linear mappings                     | <b>(S)</b> Chp 3, Chp 7<br><b>(SB)</b> 7.4, 13.3, 27.3–27.5       |
| 5. Orthogonality                                | <b>(S)</b> Chp 4  |
| 6. Determinant                                  | <b>(S)</b> Chp 5<br><b>(SB)</b> 9.1–9.2, 26.1–26.3                |
| 7. Eigenvectors and eigenvalues                 | <b>(S)</b> Chp 6<br><b>(SB)</b> 16.1–16.2, 23.1–23.3, 23.7–27.8   |