

Collegio Carlo Alberto

Mathematics for Economics

September 2011

Instructor: Pierpaolo De Blasi

Office	8, Camerata III
Office Hours	By appointment
Email	pierpaolo.deblasi@unito.it
Course Web Page	http://www.carloalberto.org/people/deblasi/
Classroom	tba
Class Times	Lectures (lect): 10am-12am Problem sessions (exer): 3pm-5pm

Schedule

The course will take place during the first three weeks of September, 5 classes per week of 2 hours each for a total of 30 hours.

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 topics are linear algebra, multivariate calculus, concavity and convexity and unconstrained optimization. A detailed course outline is attached to the end of this document. Problem sets will be assigned throughout the course; most of them will be solved in the afternoon problem sessions. I will not be collecting these assignments, however, I recommend trying to solve them prior to the problem sessions. Attendance to all classes is *mandatory*.

Exam

There will be a final exam during the fourth week of September. It will consist of a series of exercises to be solved in 3 hours time. No lecture material will be allowed.

Course Outline

I. Linear algebra

<i>I.1</i>	Elements of vector and matrix algebra	L ch	I.1—I.4, II.1—II.2, II.5
		SB ch	10.1—10.4, 8.1—8.4
<i>I.2</i>	System of linear equations	L ch	II.3—II.6
		SB ch	7.1—7.3
<i>I.3</i>	Vector spaces, linear independence and basis	L ch	III.1—III.5
		SB ch	11.1—11.3, 27.1—27.2, 27.6
<i>I.4</i>	Rank, linear mappings and kernel	L ch	III.6, IV.1—IV.5
		SB ch	7.4, 13.3, 27.3—27.5

I.5	Determinant	L ch	VII.1—VII.5
		SB ch	9.1—9.2, 26.1—26.3
I.6	Eigenvectors, eigenvalues and symmetric matrices	L ch	VIII.1, VIII.2
		SB ch	23.1—23.3, 23.7, 23.8

II. Calculus of several variables

II.1	Limits and open sets in \mathbb{R}^m	SB ch	12.2—12.5
II.2	Functions of several variables	SB ch	13.1—13.3, 13.5, 16.1—16.2
II.3	Continuous functions	SB ch	13.4
II.4	Derivatives and differentials	SB ch	14.1—14.6
II.5	Mean Value Theorems, Taylor polynomials	SB ch	14.8, 30.1—30.3, 21.1—21.2
II.6	Implicit Function Theorem	SB ch	15.1, 15.2

Textbooks

Lang, S. (1986). *Introduction to Linear Algebra (2 edn)*. Springer.

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