Collegio Carlo Alberto

Allievi Program

Introductory Mathematics

September 2008

Instructor Pierpaolo De Blasi
Office 8, Camerata III
Office Hours TBA

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Classroom TBA
Class Times Lectures (lect): 10am-12am
Problem sessions (exer): 3pm-5pm

Schedule

MON	TUE	WED	THU	FRI
1 Sept *1st lect* *1st exer*	2 Sept	3 Sept *2nd lect* *2nd exer*	4 Sept	5 Sept *3nd lect* *3rd exer*
8 Sept *4th lect* *4th exer*	9 Sept	10 Sept *5th lect* *5th exer*	11 Sept	12 Sept *6th lect* *6th exer*
15 Sept *7th lect* *7th exer*	16 Sept	17 Sept *8th lect* *8th exer*	18 Sept	19 Sept *9th lect* *9th exer*

Exam

The written exam will last two hours and will be held in the fourth week of September. Its exact date and time will be decided during the first week of the course.

Program

I. Linear algebra

• Elements of vector and matrix algebra	L ch I.1—I.3, II.2, II.2
• Vector spaces	L ch III.1
• Linear independence and basis	L ch III.2—II.5
• Rank	L ch III.6
• System of linear equations	L ch II.3—II.6
• Linear mappings, kernel and range	L ch IV.1--IV.5
• Determinant	L ch VII.1--VIII.5
• Eigenvectors and eigenvalues	L ch VIII.1, VIII.2
• Positive and negative definite matrices	S&B ch 16.1, 16.2

II. Calculus of several variables

• Limits of sequence, open, closed and compact sets in R^m	S&B ch 12.2--12.5
• Functions of several variables	S&B ch 13.1, 13.2, 13.5
• Linear functions, quadratic forms, polynomials	S&B ch 13.3
• Continuous functions	S&B ch 13.4
• Partial derivatives, differential and directional derivatives	S&B ch 14.1--14.6
• Mean Value Theorems, Taylor polynomials	S&B ch 14.8, 30.1--30.3
• Implicit Function Theorem	S&B ch 15.1, 15.2
• Elements of optimization	S&B ch 17.1--17.3
• Concave (convex) functions	S&B ch 21.1, 21.2

III. Differential equations

- First-order difference equations
- First-order ordinary differential equations
- System of linear ordinary differential equations

References

Ok, E. A. (2007), *Real Analysis with Economic Applications*, Princeton University Press.

Rudin, W. (1976). *Principles of Mathematical Analysis*. McGraw-Hill Publishing Co.

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

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