

# Syllabus Mathematics 1

## Course Information

Course title

Mathematics 1

Type of educational activity

Monographic Course

Course number

115.N

Academic year

2006/2007

Year of study

I

Trimester

I trimester

Start/End Date

2/10/2006-2/12/2006

Subject group

MAT/05- Analisi matematica

Total number of credits

6

Global workload (n. Of hours)

Number of hours lectures

48

Number of hours tutorials and  
laboratory

Number of hours individual study

Course calendar

Location of classes meeting

Change of location or/and course  
calendar

## Teacher Information

Name of lecturer

DEMEIO LUCIO

Subject group

MAT/07- Fisica matematica

Office location

Department of Mathematical Sciences  
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<http://www.dipmat.univpm.it/~demeio/>  
Office hours  
Friday 9-12 and by appointment

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# Mathematics 1: Course description

## Course Description

Aim of the course is to supply the basic notions of calculus for the functions of one real variable.

## Objectives of the course

At the end of the course, the successful student will have acquired the theoretical and practical knowledge of calculus and will be able to apply the tools to the plotting of functions and the calculation of integrals.

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# Mathematics 1: Prerequisites and introductory courses

## Prerequisites

Trigonometry.

## Introductory courses

None.

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# Mathematics 1: Course contents and teaching methods

## Course contents

Sets. Relations. Functions. Sets of numbers. The induction principle. Elements of combinatorial calculus. Elementary functions. Complex numbers. Sequences of real numbers. Limits of sequences. Indefinite forms. Neper's number and other relevant limits. Series. Geometric series and generalized harmonic series. Convergence criteria. Simple and absolute convergence. Leibnitz's criterion. Limits and continuity of real functions. The theorems of Weierstrass and of the intermediate values. Continuity of elementary functions and their inverses. Infinitesimal quantities and their comparison. Derivatives. Differentiability of the elementary functions and their inverses. Derivatives of higher order. The theorems of Fermat, Rolle, Lagrange and Cauchy. Primitives. Convexity . The theorems of de l'Hospital. Taylor's formula. Integrability and definite integrals. The fundamental theorem of integral calculus. Indefinite integrals, integration by sums, by parts and by substitution. Singular integrals, simple and absolute convergence. The comparison theorem and the criterion of the infinitesimals. Integral criterion for series..

## **Teaching methods**

Theoretical lectures with exercise sessions.

## **Materials**

Blackboard and chalk.

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# **Mathematics 1: Assessment methods and evaluation criteria**

## **Evaluation criteria**

Knowledge of the theory and ability to solve problems are given equal weight.

## **Grading**

None

## **Assessment methods**

Written test with problems and theory questions.

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# **Mathematics 1: Recommended reading**

## **Recommended reading**

Theory:

M.Bramanti, C.D.Pagani, S.Salsa: "Matematica, calcolo infinitesimale e Algebra lineare", Zanichelli.

Problems and exercises:

S.Salsa, A. Squellati: "Esercizi di Matematica, calcolo infinitesimale e Algebra lineare", vol.1, Zanichelli.

## **Supplementary reading**

P. Marcellini, C. Sbordone: "Elementi di Analisi Matematica I", Liguori Editore

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