



ACCADEMIC YEAR: 2016-2017

COURSE: Fundamentals of Mathematics

TYPE OF EDUCATIONAL ACTIVITY: (Basic, Characterizing, Affine, Free choice, Other) Affine

TEACHER: Incoronata Notarangelo

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phone: +39 0971205836

mobile (optional):

Language: Italian

ECTS: (lessons and tutorials/practice) 10

n. of hours: (lessons and tutorials/practice) 88

Campus: Potenza
Dept./School: DiS
Program: Biotechnologies

Semester: Primo

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES:

* **Knowledge and understanding.** Knowledge of some mathematical tools often used in Biology, Chemistry and Physics: elements of linear algebra, differential and integral calculus, probability and statistics.

* **Applying knowledge and understanding.** Using such mathematical tools and applying them for solving problems in Biology, Chemistry and Physics.

* **Making judgements.** Choosing suitable mathematical methods for describing phenomena and solving problems.

* **Communication skills.** Using a proper mathematical language to express the knowledge in oral and written form. Justify the choice of the method for solving theoretical and application problems.

* **Learning skills.** Learning the contents of the course and relating them to other topics in the Program of Studies. Using the suggested books for exercises, insights and comparisons.

PRE-REQUIREMENTS:

SYLLABUS:

Set theory and numbers (6 h)

Operations between sets. Numerical sets: $\mathbb{N}$, $\mathbb{Z}$, $\mathbb{Q}$, $\mathbb{R}$, $\mathbb{C}$.

Linear algebra (20 h)

Vectors and matrices. Systems of linear equations. Linear maps.

Functions and models (16 h)

Linear and nonlinear models. Elementary functions and their properties.

Differential and integral calculus (30 h)

Limits of functions and sequences. Discrete dynamic systems. Differential and integral calculus in one variable. Basics on differential calculus in several variables.

Probability and statistics (16 h)

Introduction to combinatorics, probability and statistics.



TEACHING METHODS:

The course consists in 64 hours of lessons and 24 hours of exercises tutorials.

Moreover, some optional hours will be devoted to intermediate written test and for exam simulations.

The lectures will deal with theoretical aspects of the subject, exercises resolution and some applications.

EVALUATION METHODS:

Written test and oral examination.

The aim of the examination is to test the level of achievement of the previously mentioned educational goals.

The exam is divided into 2 parts:

* a written test containing theoretical and application exercises on all the topics covered in the course; the test is intended to evaluate the knowledge and understanding of the topics and is selective (the student who does not show sufficient knowledge of the subjects is not admitted to the oral examination). To pass the test one must obtain at least 16 points out of 30. The estimated time for the test is 2 hours. During the test the use of a pocket or scientific calculator is allowed, but the use of graphic calculator, books, notes, notebook, tablet or smartphone is forbidden.

* an oral examination (to be taken during the same exam session of the written test) which will evaluate the ability to link and compare different topics of the course and will consist in the discussion of the written test, some theoretical questions and eventually short exercises. After this examination, the student will receive a final grade: in order to pass the exam this grade should be at least 18 out of 30; otherwise, one should repeat both the written test and the oral examination.

Students who attend the lectures may take optional intermediate written tests with theoretical and practical exercises on specific part of the program.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL:

Teaching material provided by the teacher, available in <https://sites.google.com/site/inconota/IM>

Textbook: D. Benedetto, M. degli Esposti, C. Maffei. *Matematica per le scienze della vita*. Ambrosiana, Milano, 2012.

Further readings:

- o M. Abate. *Matematica e Statistica*. McGraw-Hill, Milano, 2009.
- o N. Fusco, P. Marcellini, C. Sbordone. *Elementi di analisi matematica uno*. Liguori Editore, Napoli, 2002.
- o N. Fusco, P. Marcellini, C. Sbordone. *Elementi di analisi matematica due*. Liguori Editore, Napoli, 2001.
- o P. Marcellini, C. Sbordone. *Esercitazioni di matematica 1o volume, parti I e II*. Liguori Editore, Napoli, 1995.

INTERACTION WITH STUDENTS:

At the beginning of the course goals, program and evaluation method will be described.

At the end of the discussions of each topic the teacher provides the related teaching material in the web page of the course.

Office hours: Thursday from 14.30 to 16.30, office n. 63/3D214 at the second floor of DiMIE.

In addition to the weekly office hours, the teacher is available to fix appointments at different hours and/or days of the week and to answer students' questions via e-mail.

EXAMINATION SESSIONS (FORECAST)¹

07/02/2017, 21/02/2017, 05/06/2017, 10/07/2017, 01/09/2017, 02/10/2017

SEMINARS BY EXTERNAL EXPERTS YES ☐ NO ☒

FURTHER INFORMATION:

Detailed and updated information can be found in <https://sites.google.com/site/inconota/teaching/IM>

¹ Subject to possible changes: check the web site of the Teacher or the Department/School for updates.