
COURSE: : Introduction to Mathematics

ACADEMIC YEAR: 2019-2020

TYPE OF EDUCATIONAL ACTIVITY: Basic

TEACHER: Dr. Marién Abreu

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mobile (optional):

Language: **Italian**

ECTS: 10(lessons and
tutorials/practice)n. of hours: **80**(lessons and
tutorials/practice)Campus: **Potenza**

Dept./School:

Dipartimento di ScienzeProgram: **Pharmacy (LM-13)**Semester: **I**(from October 1st 2019 to
December 20th 2019 -
January 20th 2020)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

Knowledge and understanding: The general educational goal is to develop students' abstract thought, to provide them with basic mathematical concepts, tools and rigorous language, together with problem solving abilities and the capacity to read and understand simple mathematical texts.

To this purpose, the methods of calculus will be illustrated and applied to the analysis of real valued functions in one variable. The matrix methods for solving systems of linear equations will be presented, as well as the basic methods of descriptive statistics in the context of life sciences.

Applying knowledge and understanding: In this way, it is an expected learning outcome that the students will become skillful at differential and integral calculus, matrix operations and statistical data analysis.

Making judgments: At the end of the course, students should be autonomous in identifying the problems to solve, being able to break them down into smaller ones, to formulate the appropriate questions to solve them, to come to a solution and to interpret the outcomes.

Communication skills: Students should be able to communicate in mathematical terms and with the appropriate notation. Such language will be useful to formulate questions and answers properly, as well as to explain, in simple terms, the outcomes of their work.

Learning skills: If necessary, students should be able to gain further insight into mathematical and statistical content from books on these subjects, as well as following specialization courses.

PRE-REQUIREMENTS

Knowledge and skills in the following arguments: equations and inequalities of first, second and higher degrees; polynomials: operations and properties; the equation of a line; trigonometric functions and main identities; properties of powers, exponentials and logarithms.

SYLLABUS

1. *Elements of calculus (40 hours):* sets, number sets, numerical sequences, functions, limits, continuity, differential calculus in one variable, analysis of a function, integral calculus in one variable. At least **12** hours out of the 40 hours of lecture will be devoted to examples and exercises.

2. *Linear Algebra (20 hours)*: matrices, matrix operations, invertible matrices, matrix determinant, inverse matrix. Systems of linear equations and the Gaussian elimination method. At least 6 hours out of the 20 hours of lecture will be devoted to examples and exercises.

3. Elements of Statistics (20 hours): Data and sampling. Graphic presentations. Measures of location: arithmetic mean, geometric mean, median, mode. Measures of dispersion: quartiles, interquartile range, variance and standard deviation. Normal distribution. Coefficient of correlation and linear regression line. At least 6 hours out of the 20 hours of lecture will be devoted to examples and exercises.

TEACHING METHODS

The course consists of 80 hours of theoretical lessons in which multimedia material is often used to present the contents. When appropriate, discovery-based learning will be applied in order to develop the students' critical thought and curiosity. To this purpose, special activities which allow the experiential discovery (or rediscovery) of knowledge, will be performed. Classroom tutorials will be an integral part of the lessons and a few of them will take place at the computer lab.

EVALUATION METHODS

Final written and/or oral examination. The purpose of the exam is to verify the degree of accomplishment of the expected learning outcomes described above. The mandatory written test has three parts, each corresponding to one of the main arguments of the course. If it is possible to infer from the written exam that the theoretical knowledge of the student is sufficient (achievement of at least 6 point for each part), then the final mark corresponds to that of the written exam without a further oral examination. If, on the contrary, there are theoretical shortages (less than 6 points in at least one of the parts), but the total mark is greater than or equal to 18, then the student will be admitted to an oral examination and the final mark will be the outcome of such evaluation.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- J. Stewart: *Calcolo. Funzioni di una variabile*, Apogeo Education 2013
- P. Marcellini e C. Sbordone: *Elementi di Calcolo*, Liguori Editore 2004
- P. Marcellini e C. Sbordone: *Esercitazioni di Matematica, I volume*, Liguori Editore 1995
- E. Sernesi: *Geometria Vol. 1, 2^a edizione*, Bollati Boringhieri 1989
- V. Villani: *Matematica per discipline bio-mediche*, McGraw Hill 2001
- Teacher's notes will be available weekly from the web-site (see above link)

INTERACTION WITH STUDENTS

At the beginning of the course, the teacher will describe the goals, the program and the evaluation methods. At that time, a list of the students who intend to follow the course will be gathered, requesting name, surname, student ID and email. The teacher will post class notes weekly on the web-site (see above link).

Office hours: Tuesday and Thursday from 11:30 to 13:30 at the teacher's office (3D-219). Outside office hours, the teacher will be available for contact via email and/or by appointment.

EXAMINATION SESSIONS (FORECAST)¹

11/02/2020; 3/03/2020; 9/06/2020; 16/07/2020; 3/09/2020; 1/10/2020; 15/12/2020;

SEMINARS BY EXTERNAL EXPERTS YES NO

FURTHER INFORMATION

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