
COURSE: MATEMATICA II

ACADEMIC YEAR: 2019-2020

TYPE OF EDUCATIONAL ACTIVITY:

TEACHER: Prof. Sandra Saliani

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Language: Italian

ECTS: 6 (5 lessons e 1
tutorials/practice)n. of hours: 52(40 lessons e
12 tutorials/practice)Campus: **Potenza**
Dept./School: **Dipartimento di
Scienze**
Program: **Chemistry**Semester II:
(date **02/03/2020 -
31/05-20/06/2020**)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The course is a continuation of Mathematics I, and it deals with the basic elements of differential calculus in several variables, integral calculus, the theory of ordinary differential equations, numerical and power series.

The main objective of the course is to provide students with the tools in the above subjects.

It includes:

Basic elements of differential calculus in several variables, integral calculus, the theory of ordinary differential equations, numerical and power series.

The main skills (ie the ability to apply their knowledge) will be:

1. to analyze the definitions and statements of theorems;
2. to identify the assumptions required in the statement of a theorem;
3. to assess the correct procedure in the resolution of an exercise;
4. to use known theorems in the proof of other theorems;
5. to use known theorems in the resolution of exercises.

PRE-REQUIREMENTS

It is necessary to know the following basic arguments of Mathematics I:

1. sequences (properties and limits);
2. limit and derivatives of functions of 1 variable;
3. elementary functions;
4. methods for solving equations, inequalities and system.

SYLLABUS

Taylor formula (2 hours) .

Riemann integral (18 hours). The indefinite integral and its properties. Methods of integration. Integration of irrational, trigonometric and transcendental functions. Integration in an improper way.

Numerical series (12 hours). Power series.

Two-variables functions (12 hours).

The structure of the space \mathbb{R}^2 as a vector space. Basic elements of topology in \mathbb{R}^2 . Real valued functions in two real variables. Limit of a real valued function of two real variables. Continuity. Differential calculus for real valued functions of two real variables. Partial and directional derivatives. Differentiability, geometrical meaning of the differential. Relations between differentiability, derivability, directional derivatives, continuity. Local extreme points related to a real valued function with two real variables.

Ordinary differential equations (8 hours). Cauchy problem.

TEACHING METHODS

Theoretical lectures and classroom tutorials.

EVALUATION METHODS

The aim of examination is to verify the level of the achievement of the above educational goals.

The final test consists of a written examination which requires both numerical exercises and theoretical ones. The time for the written examination is 3 hours. In order to overcome the exam it is necessary to achieve at least 18/30. The student that wants to improve the grade may require to do also an oral examination.

The student that achieves 16/30 or 17/30 to the written examination, has to do also an oral examination in order to overcome the final test.

There will also be two optional tests the overcoming of which "exempt" students from the oral test. In these tests are included both the exercises and the questions related to theoretical knowledge.

Each test is overcome with 16/30 and the final grade is the average grade of all two tests plus 2 points (bonus).

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

[1] P. Marcellini, C. Sbordone, Elementi di Analisi Matematica I,
Versione semplificata per i nuovi corsi di laurea

Liguori Editore.

[2] N. Fusco, P. Marcellini, C. Sbordone

Elementi di analisi matematica 2. Versione semplificata per i nuovi corsi di laurea

Liguori Editore.

[3] M. Bertsch, R. Dal Passo, L. Giacomelli: Analisi Matematica,

McGraw-Hill.

[4] P. Marcellini, C. Sbordone, Esercitazioni di Matematica, primo e secondo volume,

Liguori Editore.

INTERACTION WITH STUDENTS

At the beginning of the course, the teacher describes the objectives, program and methods of verification.

Office hours: Tuesdays 15:00-19:00, Wednesdays 10:30-11:30, 17:00-19:00 and Thursdays 10:30-11:30.

In addition to weekly reception, the instructor is available at all times for a contact with the students, through her e-mail.

EXAMINATION SESSIONS (FORECAST)¹

20/02/2020- 11/03/2020- 23/06/2020- 14/07/2020-17/09/2020-7/10/2020- 10/12/2020

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.