

Mathematics

Mathématiques S3

IDENTIFICATION

CODE : PC-S3-MA-TF
ECTS : 5.0

HOURS

Lectures : 21.0 h
Seminars : 43.5 h
Laboratory : 0.0 h
Project : 0.0 h
Teacher-student
contact : 64.5 h
Personal work : 80.0 h
Total : 144.5 h

ASSESSMENT METHOD

Students are evaluated with written tests three times during the semester. The coefficients of the tests are [1.5,2,2.5] and they are set according to the length of the test.

TEACHING AIDS

TEACHING LANGUAGE

French

CONTACT

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AIMS

The course offered during the third semester contributes to extend the study of certain notions covered in the first year (endomorphism, integration, sequences and sums), as well as to introduce and study new concepts (multivariate functions, bilinear maps).

The study of integral calculus will be completed by the study of generalized integrals. They prepare the introduction of Fourier and Laplace transforms and the study of probabilities. After some complements on sequences (in particular the study of fixed points), numerical series and their convergence will be approached, allowing in particular to remobilize certain notions of asymptotic study seen in the first year.

A course in differential calculus will allow us to come back to the elementary notions seen in OMNI in the first year, and to ask the question of the extremums of functions in several variables.

To solve this problem, the study of endomorphisms begun in the first year will be continued by approaching the reduction of endomorphisms, which will then be applied in the framework of bilinear algebra.

Once these tools are in place, the search for the extremums of a function defined on \mathbb{R}^n can be finally solved.

This course is part of the "Pure Science" Unit.

It contributes to developing the following skills :

C1 : To analyse a (real or virtual) system or problem

C2 : To exploit a model for a real or virtual model

C5 : To process data

C6 : To communicate an analysis and a scientific approach in an argued and logical way

In this framework, the student will work and be assessed on the following points:

C11 - To split up a problem or a system into its component parts in interaction

C15 - To identify problematics or objectives

C16 - To build a proof

C25 - To use techniques of algebraic and numeric computation

C54 - To interpret data in the context of a model

C55- To summarise and link together several intermediate results in order to answer a general question

C62 - To be able to speak with a satisfying level of language aiming at a good balance between a usual and symbolic language

CONTENT

Suites (study of fixed points)
Reduction of endomorphisms
Improper integrals
Numerical series
Differential calculus
Extremum of multivariate functions

BIBLIOGRAPHY

S. Balac et L. Chupin, Analyse et algèbre : cours de mathématiques de deuxième année avec exercices corrigés et illustrations avec Maple, Presses polytechniques et universitaires romandes.

F. Butin, M. Picq, J. Pousin, Mathématiques - Cours, exercices corrigés - 2e année de classes préparatoires intégrées, Collection "Références sciences", Ellipses

PRE-REQUISITE

Mathematics Syllabus for PC-S2-MA-P

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