

Mathematics

Maths S4 FAS2

IDENTIFICATION

CODE : PC-S4-MA-F
ECTS : 6.0

HOURS

Lectures : 26.0 h
Seminars : 40.0 h
Laboratory : 0.0 h
Project : 0.0 h
Teacher-student
contact : 66.0 h
Personal work : 67.0 h
Total : 133.0 h

ASSESSMENT METHOD

The assessment will consist of :
- 2 test lasting 2 hours, coefficient 1 each
- weekly quizzes, coefficient 0,25

TEACHING AIDS

TEACHING LANGUAGE

French

CONTACT

M. PECATTE Timothee
timothee.pecatte@insa-lyon.fr
MME STEPHAN Pascale
pascale.stephan@insa-lyon.fr

AIMS

The study of normed vector spaces will be completed in this course by the study of inner products. This will in particular include a study of orthogonal projection which can be used for instance to approximate a function by a polynomial or a finite sum of trigonometric functions. These tools are essential in optimization theory.

The topics covered in bilinear algebra, linked to differential calculus, will lead to the study of extreme values of functions of several variables.

The course will finally cover the study of power series, which are a useful tool in signal processing and in probability theory.

This course falls into the Pure science teaching unit.

It contributes to the following skills in Engineer science :

C1 - To analyze a [real or virtual] system or a problem

C2 - To exploit a model of a real or virtual system

C5 - To process data

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

Within this framework, the student will work and will be evaluated on the following skills :

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 usual and symbolic language

CONTENT

Bilinear algebra [dot product and quadratic forms]

Power series

Differential Calculus (Part 2) and applications

BIBLIOGRAPHY

- F. Butin, M. Picq, J. Pousin, Mathématiques : cours, exercices corrigés - 2e année de classes préparatoires intégrées, Références sciences, Ellipses, Paris, 2013

- S. Balac, L.Chupin, Analyse et Algèbre : cours de mathématiques de deuxième année avec exercices corrigés et illustrations Maple, PPUR presses polytechniques, 2008

PRE-REQUISITE

Mathematics Syllabus for S1-FAS1, S2-FAS1, S3-FAS2