

# Analyse numérique pour les équations aux dérivées partielles

## Lecturer

Bernard KNAEPEN (Coordinator)

## Course mnemonic

MATH-F3141

## ECTS credits

5 credits

## Language(s) of instruction

English and French

## Course period

First term

## Campus

Plaine

## Course content

Introduction to numerical methods for the resolution of partial differential equations

- 1 Integration of ordinary differential equations
- 2 Differentiation by the method of finite differences
- 3 Resolution of partial differential équations
- 4 Iterative methods for the inversion of linear equations
- 5 Spectral methods: Fourier series and Chebyshev polynomials

## Objectives (and/or specific learning outcomes)

- > Formulate a numerical method for the resolution of partial differential equations
- > Write a program in the Python language to solve a large range of problems described by partial differential equations
- > Usage of programming tools including: jupyter notebook, numpy / scipy / matplotlib packages, git / github.

## Pre-requisites and co-requisites

### Required knowledge and skills

Basic knowledge of a computer programming language.

## Teaching method and learning activities

Classes with integrated practical exercises / flipped classes / personal work.

## Course notes

Syllabus and Université virtuelle

## Other information

### Place(s) of teaching

Plaine

### Contact(s)

Prof. B. Knaepen, [bernard.knaepen@ulb.be](mailto:bernard.knaepen@ulb.be)

## Evaluation method(s)

Other

### Evaluation method(s) (additional information)

- > Written exam on the course material
- > One homework to be handed in before the winter holidays. This homework cannot be presented again in second session. The mark obtained in first session is automatically transferred to the second session.

### Determination of the mark (including the weighting of partial marks)

Written exam: 75%

Homework (project): 25%

### Main language(s) of evaluation

French

### Other language(s) of evaluation, if applicable

English

## Programmes

Programmes proposing this course at the faculty of Sciences

BA-MATH | Bachelor in Mathematics | unit 3