

# Dynamique des fluides et des plasmas

## Lecturer

Bernard KNAEPEN (Coordinator)

## Course mnemonic

PHYS-F412

## ECTS credits

5 credits

## Language(s) of instruction

English and French

## Course period

First term

## Campus

Plaine

## Course content

Fluid dynamics.

- > Introduction
- > Elementary Viscous Flow
- > Waves
- > Classical Airfoil Theory
- > Vortex Motion
- > The Navier-Stokes Equations
- > Very Viscous Flow
- > Instability, turbulence
- > Magnetohydrodynamics

## Objectives (and/or specific learning outcomes)

Fluid dynamics has applications in a wide range of domains, including aeronautics, meteorology, astrophysics, nuclear fusion, blood flows or chemical front propagation. The course gives an introduction to the general concepts as well as various theoretical and numerical approaches used to describe fluid flows.

## Pre-requisites and co-requisites

### Required knowledge and skills

- > Vector calculus
- > Calculus (integration - differentiation - differential operators)

## Teaching method and learning activities

Lessons (mostly following the content of the book Fluid Dynamics - D.J. Acheson - Oxford University Press)

Assisted exercises - sessions of questions / answers.

## References, bibliography and recommended reading

Elementary Fluid Dynamics, D. J. Acheson, Cambridge University Press

An Introduction to Fluid Dynamics, G.K. Batchelor, Cambridge University Press.

Introduction to Hydrodynamic Stability, P.G. Drazin, Cambridge University Press.

## Course notes

Syllabus and Université virtuelle

## Other information

### Place(s) of teaching

Plaine

### Contact(s)

bernard.knaepen@ulb.be

## Evaluation method(s)

Other

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

Written exam based on the material given during the classes (theory and exercises).

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

Mark obtained for the written exam.

### Main language(s) of evaluation

French

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

English

## Programmes

### Programmes proposing this course at the faculty of Sciences

MA-PHYS | Master in Physics | finalité Research/unit 1 and finalité Teaching/unit 1

