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 Visqous 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-requisits and co-requisits

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