PHY1252 Fluid physics

[22.5h+15h exercises] 3 credits

This course is taught in the 2nd semester

Teacher(s): André Berger
Language: French
Level: First cycle

Aims

To present the necessary material to establish the Euler and Navier-Stokes equations and to analyse their solutions for some simple flows.

Main themes

Hypothesis of the continuum fluid, notion of stress, illustrated by examples taken from mechanics of deformable systems.
Fluid kinetics : Lagrangian and Eulerian descriptions.
Mass conservation of homogeneous and inhomogeneous fluids, macroscopic transport (advection) and microscopic transport (diffusion), Fick law.
Conservation of momentum, stress tensor, Navier-Stokes equations, simple flow analysis.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Reference books :
Batchelor, G.K., 1967, An Introduction to Fluid Dynamics, Cambridge University Press
Candel, S., 1995, Mécanique des Fluides - Cours, Dunod
Kundu, P.K., 1990, Fluid Mechanics, Academic Press
Massonnet, C. et S. Cescotto, 1992, Mécanique des Matériaux, De Boeck & Larcier
Ryhming, I.L., 1985, Dynamique des Fluides, Presses Polytechniques Romandes
Prerequisite : Analysis and mechanics courses of BAC1.

Other credits in programs

PHYS12BA	Deuxième année de bachelier en sciences physiques	(3 credits)	Mandatory