UCL Université catholique de Louvain

LPHY1352A

2010-2011

Physique des fluides II

4.0 credits	22.5 h + 7.5 h

Teacher(s) :	
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	Fundamentals: continuous media, Eulerian and Lagrangian descriptions, budget of mass, budget of momentum, budget of energy and entropy, non-inertial frame, dynamic similarity Ideal flows: dimensionless parameters, acoustic waves, compressible flows, shock waves, nonlinear waves Incompressible flows: Boussinesq approximation, energy method, 1D flows, lubrication, boundary layers, notions of turbulence Geophysical flows: geohydrodynamic equations, dimensionless parameters, inertia oscillations, Ekman layer, shallow-water equations, Poincaré and Kelvin waves
Aims :	To be acquainted with the basic principles of fluid mechanics (kinematics; budget of mass, momentum and energy) and understand the main flow regimes, i.e. the compressible, incompressible and geophysical flows. *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Other infos :	Main reference Kundu P.K. and I.M. Cohen, 2004 (3rd ed.), Fluid Mechanics, Elsevier Additional references Anderson J.D., 1998, A History of Aerodynamics, Cambridge University Press Batchelor, G.K., 1967, An Introduction to Fluid Dynamics, Cambridge University Press Frisch U., 1995, Turbulence, Cambridge University Press McWilliams J.C., 2006, Fundamentals of Geophysical Fluid Dynamics, Cambridge University Press Pope S.B., 2000, Turbulent Flows, Cambridge University Press Tennekes, H. and J.L. Lumley, 1972, A First Course in Turbulence, MIT Press Tritton, D.J., 1988, Physical Fluid Dynamics, Oxford University Press Vallis G.K., 2006, Atmospheric and Oceanic Fluid Dynamics, Cambridge University Press Van Dyke, M., 1988, An Album of Fluid Motion, The Parabolic Press Whitham, G.B., 1974, Linear and Nonlinear Waves, Wiley
Cycle and year of study :	> Master [120] in Mathematical Engineering
Faculty or entity in charge:	PHYS