UCLouvain

lgciv2056

2023

Marine Hydrodynamics

5.00 credits	30.0 h + 15.0 h	Q1

Teacher(s)	Deleersnijder Eric ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Learning outcomes	
Evaluation methods	Continuous assessment of knowledge through homework assignments (and oral presentations), leading to a final grade that cannot be modified. There will be no exam.
Teaching methods	Combination of face-to-face teaching and flipped classroom.
Content	The following topics are dealt with (bearing in mind the need to contribute to sustainable development): • quick introduction to or refresher of continuum mechanics; • reactive transport and continuity equations; • equation of fluid mechanics in a non-inertial reference frame and their application to marine hydrodynamics; • thin layer approximation, hydrostatic approximation, Boussinesq approximation, geostrophic equilibrium; • impact of Earth's rotation; • reduced-dimension models, with a focus on water column and depth-integrated models and their applications; • impact of stratification; • notions of turbulence closure schemes; • notions of numerical methods to solve the abovementioned equations; • model results diagnoses and skill assessment • case studies (selected in agreement with the students' areas of interest).
Inline resources	Slides, list of problems and computer animations available on or through Moodle
Bibliography	• Slides and computer animations available on Moodle. Books of interest: Burchard H., 2002, *Applied Turbulence Modelling in Marine Waters*, Springer Cushman-Roisin B. and J.-M. Beckers, 2011 (2nd ed.), *Introduction to Geophysical Fluid Dynamics - Physical and Numerical Aspects*, Academic Press Dyer K.R., 1997 (2nd ed.), *Estuaries - A Physical Introduction*, Wiley Fisher H.B. et al., 1979, *Mixing in Inland and Coastal Waters*, Academic Press Zheng C. and G.D. Bennett, 2002 (2nd ed.), *Applied Contaminant Transport Modeling*, Wiley
Faculty or entity in charge	GC

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Civil Engineering	GCE2M	5		🔍
Master [120] in Architecture and Engineering	ARCH2M	5		🔍
Master [120] in Mathematical Engineering	MAP2M	5		🔍
Master [120] in Physics	PHYS2M	5		🔍