




In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

5 credits

30.0 h + 15.0 h

Q1

Teacher(s)	Crucifix Michel (compensates Deleersnijder Eric) ;Deleersnijder Eric ;Massonnet François (compensates Deleersnijder Eric) ;
Language :	English
Place of the course	Louvain-la-Neuve
Aims	<i>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".</i>
Evaluation methods	Due to the COVID-19 crisis, the information in this section is particularly likely to change. Continuous assessment of knowledge through homework(s) and/or project(s), and a written exam.
Teaching methods	Due to the COVID-19 crisis, the information in this section is particularly likely to change. Classroom lectures and practical sessions, and self-learning through homework(s) or project(s).
Content	The following topics are dealt with: 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 (https://moodleucl.uclouvain.be/?lang=en).
Bibliography	<ul style="list-style-type: none"> • Slides and computer animations available on Moodle. Consulter les ouvrages suivants est conseillé (mais non obligatoire): 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	Aims
Master [120] in Mathematical Engineering	MAP2M	5		
Master [120] in Architecture and Engineering	ARCH2M	5		
Master [120] in Civil Engineering	GCE2M	5		
Master [120] in Physics	PHYS2M	5		