




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	<p>The following topics are dealt with (bearing in mind the need to contribute to sustainable development):</p> <ul style="list-style-type: none"> <li>• quick introduction to or refresher of continuum mechanics;</li> <li>• reactive transport and continuity equations;</li> <li>• equation of fluid mechanics in a non-inertial reference frame and their application to marine hydrodynamics;</li> <li>• thin layer approximation, hydrostatic approximation, Boussinesq approximation, geostrophic equilibrium;</li> <li>• impact of Earth's rotation;</li> <li>• reduced-dimension models, with a focus on water column and depth-integrated models and their applications;</li> <li>• impact of stratification;</li> <li>• notions of turbulence closure schemes;</li> <li>• notions of numerical methods to solve the abovementioned equations;</li> <li>• model results diagnoses and skill assessment</li> <li>• case studies (selected in agreement with the students' areas of interest).</li> </ul>
Inline resources	Slides, list of problems and computer animations available on or through Moodle
Bibliography	<ul style="list-style-type: none"> <li>• Slides and computer animations available on Moodle.</li> </ul> <p>Books of interest:</p> <p>Burchard H., 2002, <i>Applied Turbulence Modelling in Marine Waters</i>, Springer</p> <p>Cushman-Roisin B. and J.-M. Beckers, 2011 (2nd ed.), <i>Introduction to Geophysical Fluid Dynamics - Physical and Numerical Aspects</i>, Academic Press</p> <p>Dyer K.R., 1997 (2nd ed.), <i>Estuaries - A Physical Introduction</i>, Wiley</p> <p>Fisher H.B. et al., 1979, <i>Mixing in Inland and Coastal Waters</i>, Academic Press</p> <p>Zheng C. and G.D. Bennett, 2002 (2nd ed.), <i>Applied Contaminant Transport Modeling</i>, Wiley</p>
Faculty or entity in charge	GC

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Civil Engineering	<a href="#">GCE2M</a>	5		
Master [120] in Architecture and Engineering	<a href="#">ARCH2M</a>	5		
Master [120] in Mathematical Engineering	<a href="#">MAP2M</a>	5		
Master [120] in Physics	<a href="#">PHYS2M</a>	5		