





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 + 30.0 h

Q1

Teacher(s)	Legat Vincent ;Van Ruymbeke Evelyne ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	Phenomenology of rheologically-complex flow behaviour. Mathematical modelling based on continuum mechanics. Mathematical modelling based on molecular kinetic theory. Analytical solution of simple flow problems. Computer simulation methods for complex industrial flows. Introduction to modern research topics in the field.
Aims	<p>In consideration of the reference table AA of the program "Masters degree in Mechanical Engineering", this course contributes to the development, to the acquisition and to the evaluation of the following experiences of learning:</p> <ul style="list-style-type: none"> <li>• AA1.1, AA1.2, AA1.3</li> <li>• AA2.2, AA2.3, AA2.5</li> <li>• AA3.1, AA3.2</li> <li>• AA5.4, AA5.5, AA5.6</li> <li>• AA6.2, AA6.3</li> </ul> <p>1</p> <p>Introduce the student to the multidisciplinary topics of rheology and non-Newtonian fluid mechanics: phenomenology of rheologically-complex fluids, mathematical modelling based on continuum mechanics and molecular kinetic theory, analytical solution of simple problems, approaches to computer simulation of industrial flows, introduction to current research in the field.</p> <p>-----</p> <p><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></p>
Evaluation methods	<p><b>Due to the COVID-19 crisis, the information in this section is particularly likely to change.</b></p> <p>Oral exam (70%)</p> <p>Report on the practical work (30%)</p>
Content	<p>Many materials around us (such as food, gels, polymer melts, ...) behave as viscoelastic materials, and their flow properties depend on many parameters such as the time, the strain applied, or the temperature.</p> <p>The main objective of LMECA2141 is to look at these materials and try to understand how their viscoelastic properties depends on their composition. The lectures will focus on:</p> <ol style="list-style-type: none"> <li>1. Properties of viscoelastic materials</li> <li>2. Rheometry</li> <li>3. Flow properties of a polymer in solution</li> <li>4. Flow properties of polymer melt: the linear chains</li> <li>5. Flow properties of polymer melts: Branched polymers</li> <li>6. Flow properties of polymer melts: Influence of the sample composition</li> <li>7. Viscoelastic response of a polymer melts under large deformation</li> <li>8. Viscoelastic properties of gels and reversible polymer network</li> <li>9. Viscoelastic properties of colloidal particles: hard spheres</li> <li>10. Viscoelastic properties of colloidal particles: soft colloids</li> </ol>
Inline resources	<a href="http://moodleucl.uclouvain.be/enrol/index.php?id=8452">http://moodleucl.uclouvain.be/enrol/index.php?id=8452</a>
Faculty or entity in charge	MECA

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Mechanical Engineering	<a href="#">MECA2M</a>	5		
Master [120] in Mathematical Engineering	<a href="#">MAP2M</a>	5		
Master [120] in Electro-mechanical Engineering	<a href="#">ELME2M</a>	5		
Master [120] in Chemical and Materials Engineering	<a href="#">KIMA2M</a>	5		
Master [120] in Physics	<a href="#">PHYS2M</a>	5		