

Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

5 credits

30.0 h + 30.0 h

Q2

Teacher(s)	Van Ruymbeke Evelyne ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	Physical properties of viscoelastic materials Polymer flow properties and bonds with their composition Rheometry and polymers processing
Aims	Contribution of the course to the program objectives Axis 1: 1.1, 1.2 Identify and implement the concepts, laws, reasoning applicable to a problem; develop and use the appropriate modeling and calculation tools to solve a problem. Axis 3: 3.1, 3.2 Search in the literature, summarize and present the current state of knowledge on a specific issue related to the rheology of polymer melts. Measuring and modeling the viscoelastic properties of polymer melts. Axis 4: 4.2, 4.4 Write reports on practical works and present a specific topic related to rheology by group of 2 students. Axis 5: 5.3, 5.4, 5.6 Communicating in a schematic form, Interpreting and presenting in an accurate way a new concept in rheology, based on a scientific publication. ---- <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. The students will be individually graded based on the objectives indicated above. More precisely, the evaluation involves the grading of : • The presentation of a project in groups of two or three on a topic linked to the course content. This project will carry 20% of the total mark. • Few practical works and lab (10%) • Oral exam (70%)
Teaching methods	Due to the COVID-19 crisis, the information in this section is particularly likely to change. A combination of : 1. Ex cathedra courses : concepts are illustrated by concrete exemples taken from industrial practice and the experience of the teachers. 2. Rheometry laboratory and/or processing simulation project 3. seminars prepared and presented by the students 4. Laboratory and plant visits
Content	I. Introduction : industrial polymer processing, non Newtonian fluids, continuum mechanics refresher II. Shear viscosity, normal forces and elongational viscosity: observations and phenomenological models III. Flow through a channel IV. Capillary rheometry and extrusion defects V. Origin of viscoelastic effects; notions of rheological models; introduction to processing flow simulation VI. Cone-plate and plate-plate rheometric flow; Elongational flow VII Major industrial polymer processing operations : rheological aspects, technology and applications
Inline resources	Moodle website : https://moodleucl.uclouvain.be/course/view.php?id=8851

Bibliography	Notes de cours sur Moodle, livres à la bibliothèque en fonction des besoins
Faculty or entity in charge	FYKI

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Chemical and Materials Engineering	KIMA2M	5		
Master [120] in Electro-mechanical Engineering	ELME2M	5		
Master [120] in Mathematical Engineering	MAP2M	5		
Master [120] in Chemistry and Bioindustries	BIRC2M	5		
Master [120] in Physics	PHYS2M	5		
Master [120] in Biomedical Engineering	GBIO2M	5		
Master [120] in Mechanical Engineering	MECA2M	5		