UCLouvain

lmapr2018

2022

Rheology

5.00 credits	30.0 h + 30.0 h	Q2

Teacher(s)	Van Ruymbeke Evelyne ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	No specific prerequisites. Course mainly focused on the rheology of polymers. LMAPR2019.
Main themes	Physical properties of viscoelastic materials Polymer flow properties and bonds with their composition Rheometry and polymers processing
Learning outcomes	**At the end of this learning unit, the student is able to :** **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.
Evaluation methods	Students will be assessed individually or in groups of 2. The evaluation will consist of three components: 1. Practical works: 3 reports to be submitted during the quadrimester on the programs (Matlab or Python) developed to determine the viscoelastic properties of molten polymers, the rheometry lab. (weighting: 20%) 2. Presentation: In groups of 2, students will prepare a presentation of 20 minutes dealing with a concept of rheology or processing (weighting: 20%) 3. Oral examination (weighting: 60%)
Teaching methods	1. Ex-cathedra course 2. Rheology concepts presented by students at the beginning of each class 3. Program development (Matlab, Python) to determine viscoelastic properties of molten polymers and compare them to experimental data 4. Rheometry laboratory
Content	1. Properties of viscoelastic materials 2. Rheometry 3. Flow properties of a polymer in solution 4. Flow properties of a polymer in the molten state - Linear polymers 5. Flow properties of a polymer in the molten state – Branched polymers 6. Flow properties of a polymer in the molten state - Influence of the composition 7. Viscoelastic response of a polymer subjected to large deformations 8. Viscoelastic response of block copolymers 9. Viscoelastic Properties of Gels and Reversible Polymeric Networks 10. Viscoelastic properties of colloidal materials 11. Viscoelastic Properties of Soft Colloidal Materials 12. Polymer processing - I 13. Polymer processing - II
Inline resources	Moodle website : https://moodleucl.uclouvain.be/course/view.php?id=8851
Bibliography	Slides, book chapters and articles available on Moodle

Faculty or entity in charge	FYKI

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Chemical and Materials Engineering	KIMA2M	5		
Master [120] in Biomedical Engineering	GBIO2M	5		
Master [120] in Mechanical Engineering	MECA2M	5		
Master [120] in Chemistry and Bioindustries	BIRC2M	5		
Master [120] in Electro-mechanical Engineering	ELME2M	5		
Master [120] in Mathematical Engineering	MAP2M	5		
Master [120] in Physics	PHYS2M	5		