UCLouvain

lmapr2016

2026

Project in Polymer Science

5.00 credits	30.0 h + 15.0 h	Q2

Teacher(s)	Fustin Charles-André ;Jonas Alain ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Main themes	The project is based on a real problem inspired from industry, from research, or from our socio-culturo-economical environment, in the field of polymers. The specific theme is defined every year. For instance, the students might receive a virtual budget allowing them to analyze a complex object ("reverse engineering"). The project could also consist in selecting a polymer material for a specific application. It might be related to the issue of recycling (including, e.g., chemical, mechanical, technical, economical and ecological aspects). It might center on the analysis of an emerging issue of interest to the general public. It might also explore an emerging application of polymer materials. In all cases, the project will help students to discover and use the main characterization techniques of polymer science and technology. It will contribute to have them learn how to analyze a complex issue, and to produce deliverables respecting precise specifications while respecting a quality-oriented methodology. Preferably, the deliverables should include the use of collaborative communication tools such as wikis, e-portfolios, etc.
Learning outcomes	**At the end of this learning unit, the student is able to :** **Contribution of the course to the program objectives** This course contributes to the development of the following learning outcomes : • AA2.1, AA2.2, AA2.3, AA2.4 • AA3.1, AA3.4 • AA4.1, AA4.2, AA4.3, AA4.4 • AA5.1, AA5.2, AA5.3, AA5.4 • AA6.5 With variable emphasis on some of the learning outcomes depending on the specific project. **Specific learning outcomes of the course** This course aims to have students facing practical problems related to the synthesis, the processing, the use and the life-cycle of polymer materials. The specific learning outcomes of the project vary yearly. The need to acquire new notions and concepts by a personal work, and to use and apply techniques not described in previous courses, is intrinsic to the project. At the end of this project, the students will have acquired a practical ability to handle problems related to research, quality control, selection, or customer management in the field of R&D or technical business, as would befit a young engineer or scientist hired by a polymer company.
Evaluation methods	The course is not based on lectures, but on the personal work of students in groups supervised by a teacher. At the end of the project, the students will deliver a report in a professional modern way (website, or wiki, or small movie, or scientific paper, or exhibition for a general public, or popularization scheme, or kit of scientific reach-out for kids, or draft of a book, etc.). The final note takes this group work into account, as well as the personnal work performed by the student (report on a material selected and studied for the object); it is delivered after a private oral exam with the teachers. Group work is graded over 7 points; personnal work over 5 points; and the oral exam over 8 points. The use of generative artifical intelligence is authorized but needs to be indicated at the concerned places of the reports, and respects the general principles as published by EPL. If, for one part of the continous evaluation process, a student does not abide to the methodological instructions defined on moodle by the teachers, including the use of online resources and student collaborations, all the continuous evaluation will obtain a grade of 0.
Teaching methods	Project-based learning.
Content	The content of the project varies yearly but rests since 2014 on additive manufacturing. Students in groups imagine a complex object containing a series of polymer materials (a model of a car, a prosthesis, a quadricopter drone, a manipulation tool,...), make a computer-assisted drawing of this object, and 3D-print it (by fused deposition modelling). The students have to select the materials based on readings and experiments made in the laboratory, using a vast range of advanced techniques, taking into account eco-design for an easy product recyclability. They

	report their work using modern communication tools. The project requires to develop strategies for the management and coordination of a complex project.
Inline resources	Testimonies from a previous project: https://podcast.uclouvain.be/k3qZpMIsrh Web site of the project in 2018: https://moodleucl.uclouvain.be/course/view.php?id=11696 Web site made by the students in 2017: https://greglbr.wixsite.com/projectpolymer2017
Bibliography	Les documents nécessaires sont actualisés d'année en année, selon le projet; ils sont mis à disposition des étudiants sur le site internet du cours. The required documents are updated yearly, depending on the project. They are made available on the web site of the course.
Other infos	It is highly recommended to have attended an introductory course on polymer physics and chemistry.
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 Chemistry	CHIM2M	5		
Master [120] in Chemistry and Bioindustries	BIRC2M	5		
Master [120] of Education, Section 4 : chemistry	CHIM2M4	5		