LBIRC2201

2015-2016

Industrial project in chemical and biochemical engineering

5.0 credits	52.5 h	1q

Teacher(s) :	Gerin Patrick ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	Icampus Autre: bibliographic databases accessible via the UCL libraries, technical and commercial documentation available online
Prerequisites :	Knowledge and skills acquired throughout the whole science, engineering and economy courses of the BIRC programme. *The prerequisite(s) for this Teaching Unit (Unité d'enseignement – UE) for the programmes/courses that offer this Teaching Unit are specified at the end of this sheet.*
Main themes :	A. Industrial partners submit to the students a problem of chemical or biotechnological engineering. The industrial partners belong to various technology areas: chemistry, biotechnology , biomedicine, environment. The problems are submitted with all the reality of their complexity, as experienced by the company. Different types of projects can be proposed : 1. design of a facility or part of a industrial facility with a few (2 or 3) unit operations (eg, filtration, sedimentation , distillation, drying, grinding ...). ; 2. "exploratory " study to identify and assess the feasibility of various possible solutions to the industrial problems ; 3 . technical (possibly technical and economic) comparison of two or more industrial processes with a single purpose . B. Each student team takes in charge the resolution of one problem, with interactions with the industrial partner and with mentoring by the teacher. C. Each student team synthesize the problem, the solving approach and the solutions in a written report and an oral presentation , in a way that is understandable and usable by an engineer with no particular specialization.
Aims :	a. Contribution de l'activité au référentiel AA (AA du programme) 1.4, 1.5 2.1, 2.2, 2.3, 2.4 3.6, 3.7, 3.8 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7 5.5 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8 b. Formulation spécifique pour cette activité des AA du programme (maximum 10) At the end of this activity, the student is able to take in charge and solve a complex problem in industrial chemistry or biotechnology, i.e. : - Analyze and understand the problem, identify its ins and outs in the context of the company, and distinguish the key elements, by mobilizing all its knowledge of chemical bioengineer ; - Clarify and if necessary redefine the problem and the objectives of the resolution; - Identify, acquire and integrate the new knowledge needed to carry out the resolution of the problem ; - Investigate, identify, design and document potential solutions to the problem ; - Pre- select the technological solutions that seem most appropriate, on the basis of all his knowledge of biochemical engineer, as well as the new knowledge acquired for the purpose of solving the problem ; - Develop the pre-selected solutions, in their technological and their design details, taking into account the constraints of practical implementation in the company; - Check the suitability of proposed solutions to the problem posed, by assessing and comparing their performance and impacts; - Formulate the recommended solution and argue that it indeed solves the problem ; - Communicate the problem analysis , solution proposals and resolution process in a structured , rigorous and synthetic way, orally and in writing ; - Orally defend his claims. *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".*

Evaluation methods :	Oral presentation and defence (answer to questions and justifications) of this solutions to the problem. Final written report of each the student team, that has to define the initial problem in its context, and build and argue the solution(s). criteria: - Relevance and extent of information search - Relevance and rigour in the solutions developed - Critical analysis of scientific and technological aspects of the solution - Relevance and rigour in the presentation and structuring of the subject - Clarity and completeness of the communication, quality of writing - Synthetic communication of the subject - Respect of the bibliographic citation rules
Teaching methods :	Personal and team work, self-learning, guidance by teachers and industry partners. Writing preliminary and full report, oral presentation and defence.
Content :	Real problems of industrial chemistry or biotechnology are submitted by companies, which also provide the useful data they have. The students organize themselves into a group of 4-6 students to solve one problem. The project involves individual work (information search , acquisition of theoretical background , calculations ...) , team work, and weekly meetings with at least one of the teachers. At the 7th week, an interim report has to be submitted to the industrial partner to present the problem, the possible solutions envisaged and to justify the selection of solutions that will be developed in more detail. The whole project solution is presented and defended orally in the 13th or 14th week to all students and in the presence of the industrial partner. The written report is completed by mid- February. The oral and the written report must be formulated to be understandable by bioengineers. The Project in Industrial Chemistry requires the students to use in a integrated way the knowledge and competence they have acquired through all the courses of their bio-engineer education, 1) to understand and analyse an engineering problem in industrial chemistry or biotechnology, 2) to identify and document the possible ways to solve it, 3) to select the most promising solutions, 4) to develop the latter, ideally up to the dimensioning of the unit operations, 5) and finally to critically review the retained solutions. The project requires the students to present, justify and defend their intellectual approach and their solutions, with the rigour, precision and technological sense necessary for bioengineers. The project also requires students to mobilize their skills in teamwork, initiatives and work organization to carry out their project.
Bibliography :	Bibliographic and technical research guided by teachers depending on the problem. Recommendations on the organization of teamwork and writing scientific and technical reports are available on icampus.
Other infos :	1. For students who are not enrolled in the BIRC2M master, participation is subjected to the following conditions: 1. contact the coordinator of the course, no later than August 20, to allow him to organize the various projects; 2. participate in (and be present) to completion in February. 2. Given the methods of assessment, the assessment score is only available in June. 3. Wherever possible, supervision by a team of teacher competent in process engineering for the various specializations of students, including if possible a teacher in chemical engineering (EPL). 4. The activity involves travel and visit of the industrial partners plants.
Faculty or entity in charge:	AGRO

Programmes / formations proposant cette unité d'enseignement (UE)				
Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
Master [120] in Chemistry and Bioindustries	BIRC2M	5	LBIRC2107 **and** LBIRC2109	