UCLouvain

lfsab1503

2017

Project 3

5 credits	30.0 h + 30.0 h	Q1

Teacher(s)	De Wilde Juray ;Luis Alconero Patricia ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	Depending on the theme, the project will allow the students to: • study industrial processes for the production of base chemicals, in all their aspects, • model and design elements of these processes on the basis of technical and economic constraints through notions learned in courses of physics and / or chemistry, • analyze the energy needs and the environmental impact of these processes and propose improvements • To the extent possible, the impact of these improvements will be quantified.
Aims	**Contribution of the course to the program objectives** Given thecompetency framework of the Bachelor's program in Engineering Sciences, civil engineer orientation, this course contributes to the development and acquisition of the following learning outcomes: ' Axis1.1: to apply the concepts, laws, reasoning to a disciplinary problem with framed complexity; ' Axis1.2: to describe appropriate modeling and computation tools to solve framed disciplinary problems; ' Axis2.1: to describe and formulate the problem to be solved or the functional need in the form of a set of specifications; ' Axis 2.3: to develop working assumptions for modelling a framed problem; ' Axis2.4: to model a problem and develop one or more technical solutions that meet the specifications; ' Axis2.6: to synthesize in order to clarify: the assumptions, the modeling and the proposed solution; ' Axis2.7: to look critically at the selected assumptions and the relevance of the solutions (individual self-assessment); ' Axis2.8: to makerecommendations to improve the studied solution, the analyzed system. ' Axis3.1: to engage on a work plan collectively, schedule (and roles to hold); ' Axis 3.2: to work in a team: manage disagreements, make decisions when there are choices to make, divide the work; ' Axis 3.3: to have acritical view of how to work in teams to solve a project (collective self-assessment). ' Axis4.1: to discuss and convince within the team and vis-à-vis teachers and boards; ' Axis 4.2: to communicate graphically and schematically, to interpret a schema, to present the results of a job, to structure information; ' Axis 4.3: to read, analyze and use technical documents (regulations, plans, specifications, ...); ' Axis 4.4: to prepare written synthesis documents, taking into account the requirements in the context of the missions (projects and problems); ' Axis 4.5: to make a convincing oral presentation using modern communication techniques. **Specific learning outcomes of the course** At the end of the course, students will be able to: ' create and interpret a flow-sheet of a chemical process; ' derive and use mass and heat balances and the thermodynamic constraints of chemical reactions to realize a preliminary design of a chemical process (the project integrates the disciplinary objectives of "chemistry", "physics" and "mathematics"); ' discover the safety and security dimension of chemical processes and realize and interpret a safety analysis (HAZOP); ' discover the industrial dimension of the profession of engineer; ' discover the practical dimension and numerical modeling of the profession of engineer and the relationship between practice and theory; ' use the different available languages (mother tongue, mathematical language, graphical languages) to communicate effectively in terms of the objective (e.g.: principle description or detailed specification); • use templates for both descriptive and predictive purposes; • plan together the tasks by distributing the work to enable everyone to achieve the learning objectives. - - - - *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	The project is evaluated on the basis of a written report and an oral presentation (per group). This assessment accounts for 70% of the mark. Students will also be assessed individually by a written exam based on the objectives outlined above. This assessment accounts for 30% of the note. The final mark will be calculated as: ' 70% for the group mark, of which 30% for the oral presentation and the poster and 40% for the intermediate and final reports; ' 30% for the individual written exam. In case the exam is failed, a different calculation will apply, based on two critical marks: - with a mark less than 8/20, the student will not receive the group mark (0-100 weighting); - with a mark equal to or above 8/20 (8'mark<10), the student will receive part of the group mark with a weighting between 0-100 et 70-30.
Teaching methods	The course "Project 3" is a course based on a project. Students work in groups of 6 to 8 members and are supervised by tutors and teachers. A first session in an auditory during the first week aims at explaining the objectives and the organization of the project. A few short sessions are also planned in an auditory to give explanations on specific aspects.
Content	As part of the current project, the students will analyze different aspects of an industrial production process of a base chemical: ' analysis of the process flow-sheet and identification of different unit operations and flows of matter and energy; ' development of overall mass and energy balances based on the flow-sheet for a specified capacity, i.e. calculation of what enters and leaves the system and its different units in terms of matter and energy; ' analysis of thermodynamic constraints of the different conversion steps; ' analyze the energy consumption and the environmental impact of the process, giving possible solutions for improvement and quantifying the potential impact of the proposed solution; • analysis of process safety: (a) methodology for the overall safety analysis; (b) detailed analysis, focusing on a specific element (e.g. safety valve); (c) analysis of the shut-down and start-up of the process or a part of the process (with numerical simulation).
Inline resources	http://icampus.uclouvain.be/claroline/course/index.php?cid=LFSAB1503
Bibliography	Des chapitres de livre de référence, des articles scientifiques nécessaires pour réaliser le projet sont fournis aux étudiants et disponible sur iCampus.
Faculty or entity in charge	BTCI

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Bachelor in Engineering	FSA1BA	5		🔍