




5 credits

30.0 h + 15.0 h

Q2

Teacher(s)	Debecker Damien ;Françoise Olivier ;Luis Alconero Patricia coordinator ;Noiset Olivier ;
Language :	English
Place of the course	Louvain-la-Neuve
Prerequisites	<i>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.</i>
Main themes	<ul style="list-style-type: none"> • Regulation in the industry • Last generation technology for the treatment of gaseous, liquid and solid streams • Life Cycle Assessment (LCA)
Aims	<p>Given the AA repository of the program of "Master ingénieur civil en chimie et science des matériaux", this course contributes to the development, acquisition and evaluation of the following learning outcomes:</p> <ul style="list-style-type: none"> • AA1.1, • AA2.1, AA2.2, AA2.3, AA2.4, AA2.8, • AA3.1, AA3.2, • AA4.1, AA4.2, AA4.3, AA4.4, AA4.5 • AA5.1 <p>1 More concretely, at the end of the course, the student will be able to :</p> <ul style="list-style-type: none"> • To have acquired a global and in depth vision of practice in treatment and valorization of gas, liquid and solid residual streams. • To know the last generation technologies under research to improve or substitute conventional technology. • To have acquired, by a visit to an industrial plant, a practical view of present methods in use and possibilities of waste valorization (material or energy). • To be able to write a Life Cycle Assessment (LCA) report based on commercially available software's. • To be able to evaluate critically an industrial process and propose the best available technologies. <p>-----</p> <p><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></p>
Evaluation methods	<p>Exam: 10 questions related to the 10 seminars. Corrections will be done in collaboration with the experts (35%)</p> <p>Project: Report of the project and oral presentation at the end of the course. Experts may be invited to attend the presentations and evaluate specific aspects taught during the course (65%)</p>

Teaching methods	<p>The course will be composed of 10 seminars given by experts in the matter and a project that will focused on the application of aspects taught in the course, such as life cycle assessment, economic evaluation, gender and ethical issues, and intellectual property, on the manufacture of a product.</p> <p>Seminars:</p> <p>The following topics will be addressed in the seminars:</p> <ol style="list-style-type: none"> 1. Introduction to sustainable development 2. Environmental evaluation of a product/process using life cycle analysis 3. Safety in the industry 4. Economic evaluation of processes – case of chemical processes 5. Ethics and gender in engineering 6. Intellectual property and implication in industry 7. General and specific legislation in the industry (focus on REACH) 8. Technology for human development/ engineering in developing and developed countries 9. Creative thinking: how to develop one's own ideas 10. Group management in industry <p>Project:</p> <p>Groups of 4-6 students will evaluate quantitatively the environmental impact of a product/process via a life cycle assessment, perform an economic evaluation and discuss several aspects related to the topics given in the seminars (e.g., ethics, gender issues, intellectual property). The adequate software will be used, if required (e.g., SimaPro for the life cycle assessment). The students will be asked to verify/compare their final results with real examples provided by experts or on-line sources.</p>
Content	<p>This course is presented as a pilot course to develop transversal aspects of key importance for an engineer. Sustainability is the current driving force in the industry, which tries to satisfy a growing and demanding society. Environmental, economic and societal aspects are the cornerstone of a sustainable development, but we have to go further and consider cultural aspects, gender dimension, European and national regulations, ethics, and many more factors that establish the rules of the game. Understanding the limitations that an engineer will find during his/her career when developing a new idea, system, or process, is of utmost importance. These limitations can appear due to factors that are not related to the technical viability. The same product or the same process may be possible in one specific country/society and it may not make sense in another. Thus, this course will provide a multidisciplinary background to our chemical and environmental engineers.</p>
Inline resources	<p>Site Moodle du cours: https://moodleucl.uclouvain.be/course/view.php?id=9064</p>
Bibliography	<p>Des notes de cours, diapositives</p>
Other infos	<p>All the course material will be available in the Moodle platform.</p>
Faculty or entity in charge	<p>FYKI</p>

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Chemistry and Bioindustries	BIRC2M	5		
Master [120] in Chemical and Materials Engineering	KIMA2M	5		
Master [120] in Environmental Bioengineering	BIRE2M	5	LBIRC2109 AND LB RTE2101 AND LB RTE2201	
Master [120] in Environmental Science and Management	ENVI2M	5		