




Teacher(s)	Contino Francesco ;Defourny Pierre ;Javaux Mathieu (coordinator) ;Van den Broeck Goedele ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	This project is open to all students of the Master of Bioengineering (A, C, E or F) subject to completion of the bachelor's degree program. ATTENTION: this course may NOT be taken without first enrolling in LBIRE2235 'Innovative system management for sustainability'.
Main themes	This integrated project in sustainability engineering requires students in option 12 (A, C, E or F) to mobilize their knowledge and skills in an integrated, cross-disciplinary way, regardless of the Master's degree in which they are enrolled. The aim is to analyze, diagnose and propose solutions to a problem in the field of sustainable engineering. Students will be required to design and dimension solutions to reduce the ecological and environmental footprint, maximizing the use of renewable energy, and reducing the use of energy and resources. The complexity and timeframe of the project will correspond to situations that are likely to arise in a professional context. The project will involve both written and oral communication of results in a form that is understandable and usable by non-specialists.
Learning outcomes	<p>At the end of this learning unit, the student is able to :</p> <p><u>Contribution of this activity to the learning outcomes referential :</u></p> <p>2.4, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 6.2, 6.3, 6.5, 6.6, 6.7, 6.8, 7.1, 7.2, 8.1, 8.2</p> <p><u>Specific formulation of the learning outcomes for this activity</u> A the end of this activity, the student is able to :</p> <ul style="list-style-type: none"> • Integrate various scientific knowledge and skills for addressing a real-world complex problem of bioengineering that relates to technologies and management of information and by accounting for technical, legal and economic constraints; • Design original and scientifically sound approach for solving a multidisciplinary problem in the bioengineering framework; • Plan the necessary steps of the projects by working efficiently and in a liable way within a team; • Work within a team by promoting initiative, commitment and adaptation in order to honor deadlines; • Communicate efficiently about the proposed solutions both in a written and oral way by using a rigorous approach that still remains accessible for non-specialists; • Interact in an efficient and respectful way with various stakeholders by promoting dialogue, empathy and assertiveness; • Understand the legal and technical aspects that are relevant for the acquisition, processing and communication aspects that are involved in the framework of the project
Evaluation methods	A part of the final grade will be based on an assessment of three deliverables during the year. The remainder of the final grade will be based on a multi-criteria evaluation of the project report (quality of technical solutions, quality of presentation of the report) and the oral presentation and defense of the project (quality of presentation and answers to questions).
Teaching methods	<p>During the first week of the term, the course organization is introduced, student groups are formed, the specific project problem is outlined, the expected results are explained, and the various stakeholders are identified.</p> <p>Following a site visit and/or a meeting with stakeholders, the students themselves define a detailed project specification, the activities to be undertaken, and the schedule. From the third week onwards, students carry out this schedule.</p> <p>Regular meetings with the supervisors enable the execution of the various stages to be monitored. Three deliverables to be handed in over the course of the four-month term enable progress to be reviewed. In week 14, students hand in their reports. The project is presented and defended orally by the group at the January session.</p>
Content	<p>PLEASE NOTE: this course may NOT be taken without first enrolling in LBIRE2235 'Innovative system management for sustainability'.</p> <p>The projects presented to the students each year will focus on different real-world topics, which may involve different stakeholders (administration, NGOs, companies, public services, etc.). In order to best simulate the workings of a real design office, students will work in groups of 3 to 6. They will synthesize the problem presented to them and plan the corresponding work (stages and milestones, external resources to be used, deadlines to be met) in order to obtain a solution that is both realistic and scientifically sound.</p>

	<p>Depending on the problem considered, the work will include at least two priority tasks from among the following (the other tasks will therefore be considered subordinate):</p> <ul style="list-style-type: none"> • Data collection, data validation and correction, management of corresponding databases, analysis ; • System and macrosystem definition; • Diagnosis of the problem and redefinition of the objectives to be achieved <p>- System modeling ;</p> <ul style="list-style-type: none"> • Optimization or scenario analysis to quantify optimal solutions • Cost/benefit analysis; • Written and oral communication with stakeholders and scientists who are not specialists in the field, to ensure appropriate dissemination of results (indicators, computer codes, web interfaces, etc.) <p>Students will report on the intermediate results of their project at key points. A written report is due at the end of the term. This report will be presented orally during the examination session.</p>
Other infos	This course can be given in English and French.
Faculty or entity in charge	AGRO

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Forests and Natural Areas Engineering	BIRF2M	5		
Master [120] in Environmental Bioengineering	BIRE2M	6		
Master [120] in Chemistry and Bioindustries	BIRC2M	6		
Master [120] in Agricultural Bioengineering	BIRA2M	6		