UCLouvain

lbir1230a

2026

Introduction à l'ingénierie de la biosphère

3.00 credits	30.0 h	Q2

Language :	French
Place of the course	Louvain-la-Neuve
Main themes	The course proceeds from actual stakes related to the biological, agronomical and environmental engineering and will approach the following themes: - the bio-geochemical cycles of the biosphere (water, carbon, nitrogen); enrgetic flows. - notions of bio-climatology, classification of climats, climatic indicators. - basic notions of ecosystems (biotopes and biocenoses, trophic chains); food chains; production and productivity. - sustainable development; notions of equilibrium and imbalance; notions of vulnerability; biodiversity and the conservation problematic; pollution and tracability problems. - role of the soil as a reactor in the functioning of ecosystems: water and mineral elements storage, alteration and acidification; notions of resilience, mobility of biogenous elements and bio-pedological cycles; storage and mobility of contaminants. - impact of the human being on the functioning of the ecosystems and on the soil.
Learning outcomes	
Evaluation methods	Written examination in the form of a multiple-choice questionnaire consisting of three equal parts corresponding to the subjects taught by the three teachers. The examination constitutes a whole and cannot be taken in parts.
Content	1. Table of contents The course is divided into three parts, each taught by a different lecturer. The parts taught by Pierre Defourny and Philippe Baret make up the LBIR1230A course, which is open to all students. The part taught by Pierre Delmelle requires prior knowledge of Earth Sciences and basic Chemistry. 1a. Global ecological changes (Pierre Defourny) 1b. Global biophysical processes (Pierre Defourny) 2a. Major cycles (Pierre Delmelle) 2b. Introduction to soil science (Pierre Delmelle) 3a. Introduction to ecology (Philippe Baret) 3b. Principles of agriculture (Philippe Baret) 3c. Bioengineering and sustainable development (Philippe Baret) 2. Additional explanations (if necessary) The state of scientific knowledge concerning various global ecological and climatic changes is described and discussed in detail, then put into perspective in relation to the political and social responses that have been implemented. Basic concepts are taught using concrete examples related to biosphere engineering. For example, based on an issue such as global human food supply, various basic concepts will be taught: food and trophic chains, energy flows and productivity, biogeochemical cycles (water, carbon, nitrogen), soil storage and mineral and water supply functions, etc. Teaching will be based on a problem-based approach, where basic concepts will be acquired through analysis of the issues and putting the concepts into perspective.
Inline resources	Moodle
Other infos	The course does not require any specific materials that are subject to a fee and considered mandatory. Any fee-based materials that may be recommended are optional.
Faculty or entity in charge	AGRO

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Minor in Development and Environment	MINDENV	3		
Additionnal module in Biology	APPBIOL	3		
Minor : Issues of Transition and Sustainable Development	MINDD	5		
Bachelor in Engineering : Architecture	ARCH1BA	3		
Master [120] in Urban Planning and Territorial Development	URBA2M	3		