UCL Université catholique de Louvain

LBRES2106

2013-2014

Integrated management of the soil-plant system

6.0 credits	45.0 h + 15.0 h	2q

Teacher(s) :	Kruyts Nathalie ; Draye Xavier (coordinator) ; Declerck Stephan ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	iCampus
Prerequisites :	A course introducing soil science
Main themes :	· Soil-plant interactions : functioning of cultivated soils, determinants of soil fertility, dynamics of soil exploration by root systems, rhizospheric processes · Biogeochemical cyles and processes : action of soil organisms (plants and animals) on the nutrient cycles, ecological requirements and biogeochemical action of organisms, soil degradation, modifications of biological properties - Fertiliser science : estimation of crop demand, use of mineral and organic fertilisers, recent technological advances
Aims :	a. Contribution of this activity to the program learning outcomes M1.2, M1.4, M2.4, M3.1, M4.3, M6.1 b. Learning outcome specifics for this activity At the end of this course, the student is able : · to understand soil-plant interactions at the field scale in order to optimise the management of the cropping system and its impacts on the soil and crop · to understand the dynamics and complexity of soil-plant interactions, with reference to the functioning of cultivated soils and to the strategies of soil exploration and exploitation by plants · to interprete plant responses to its environments and to crop management pratices and the impact of the cropping system on the soil · to consider fertility management in a systems framework respectful of environment, through the adoption of ad hoc crop management practices and the monitoring of the cropping system. *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 :	Written exam Presentation of a seminar (partim Soil Plant Interactions)
Teaching methods :	Course Coached preparation and presentation of seminars (by students, partim Soil-Plant Interactions) Excursion and seminars (partim Fertiliser science)
Content :	Table of content 1. Soil-plant interactions · Properties, heterogeneity, fonctioning and evolution of cultivated soils · Determinants of soil fertility. · Notion of soil profile ; evaluation of humus and nutrients content, available soil nutrients , indicators of fertility (definition, monitoring) · Soil exploration by roots : growth and development of typical crop root systems ; response of root distribution to transient and permanent soil conditions · Rhizospheric processes : soil-plant interactions at the rhizosphere scale (uptake, acquisition strategies, exsudation) ; complexity and dynamics of these processes 2. Biogeochemical cycles and processes · The soil biome · Mycorhizal symbiosis o Plant ' mycorhizae relations o The mycorhized root o Mycorhizal networks · Biogeochemical cycles o Nitrogen o Phosphorus o Potassium

	o Sulfur o Carbon 3. Fertiliser science · Estimation of crop nutrient requirements : diagnostic and measurement (trials, soil and plant analyses, indicator species, deficiency symptoms, etc.) ; analytical methods · Use of mineral and organic fertilisers : fertiliser use in crop management ; consideration of soil properties and wheather data (case studies) · Recent trends in fertiliser use : delayed fertiliser, organic agriculture, intensive agriculture and environment considerations.
Bibliography :	Mandatory material Powerpoint slides (online iCampus)
Cycle and year of study :	> Master [120] in Agricultural Bioengineering > Master [120] in Environmental Bioengineering
Faculty or entity in charge:	AGRO