UCL Université catholique de Louvain

LBRES2105

2013-2014

Drainage and soil conservation

5.0 credits	30.0 h + 22.5 h	2q

Teacher(s) :	Bielders Charles ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	iCampus
Prerequisites :	Soil physics Spreadsheet management (ExcelTM,') Geomatics (basic use of Geographical information system)
Main themes :	- Water, wind and tillage erosion : physical processes and quantification - Modeling of water erosion at plot and watershed scale - Principles of soil conservation in temperate and tropical environments - Soil conservation techniques and practices : physical, agronomical, vegetative, and management practices - Role of drainage - Characteristics of drainage networks, placement and maintenance - Dimensioning of drainage network
Aims :	a. Contribution de l'activité au référentiel AA (AA du programme) M2.2 ; M2.3 ; M6.5 ; M6.8 b. Formulation spécifique pour cette activité des AA du programme Soil conservation (3.5 ECTS) At the end of the course and practicals, the students: - Will master the main mechanisms involved in the degradation of soil by water , wind and tillage erosion; - Will be able to propose a methodology on an experimental basis to quantify land degradation by water erosion at the plot scale or watershed ; - Will be able to implement a simple model of water erosion in a GIS to assess the risk of erosion at the scale of the plot or watershed ; - Will master the principles of soil conservation and will be able to propose practices, technologies or devices adapted to the socio-economic and technical context of operators and aiming at reducing erosion at the plot and watershed scale; - Be able to communicate the results and conclusions of the simulations and experiments in the form of tables, graphs and scientific diagrams in a written report reflecting mastery of software tools essential for effective professional communication. Drainage (1,5 ECTS) : At the end of the course and lab, the student will be able to: - Master the theoretical concepts underlying the flow of water into drains and design techniques of drainage; - Assess the value of drainage on the basis of technical, economic and environmental considerations; - Dimension a parallel drainage network using the relevant equations. *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 :	Soil conservation (70% of total) - 2 oral questions with written preparation (40%) - Evaluation of practicals, based on written report (60%) Drainage (30% of total) - Written exam : exercices (60%) - 1 oral question orale with written preparation (40%)

Teaching methods :	- Upon request, the lectures are given partly in English, but always illustrated by transparencies in French. - Reference book in English. - Practical work in the computer room lead the student to operational use of the RUSLE model. - Practical work in the laboratory (grass strip, wind erosion) - Exercise sessions (drainage, tillage erosion) - The practicals, to be carried out in a team, and report writing stimulate collective work and the development of skills related to professional communication;
Content :	Classes : Soil conservation - Definitions, on- and off-site consequences of water erosion - Forms of water erosion : interrill, rill, gully - Factors of water erosion : rain, soil, terrain, cultural practices, crop - Processes: detachment, transportation, storage - Measurement of erosion - Empirical (RUSLE) and deterministic modelling - Principles and methods of soil conservation * Wind erosion (2h) * Tillage erosion (2h) Drainage (8h) - Functions of agricultural drainage in temperate and tropical regions - Structure of a drainage network : arrangement, drains, envelope ' - Calculation of a drainage network using the equations of Hooghoudt , de Zeeuw and Hellinga , Glover - Dumm . - Establishment of a network: principles and equipment Practicals Soil Conservation - Use of the RUSLE model on simple and complex slopes, and management of a small virtual watershed - Evaluation of a grass strip - Measurement of saltation (wind erosion) - Estimation of tillage erosion on complex slope (spreadsheet) Drainage 2 practicals with exercices using a spreadsheet, in preparation for the exam
Bibliography :	Reference book : 'Soil conservation' de R.P.C. Morgan Transparencies available on iCampus Hand-out for the Drainage part, available on iCampus
Cycle and year of study :	> Master [120] in Agricultural Bioengineering > Master [120] in Environmental Bioengineering
Faculty or entity in charge:	AGRO