UCL Université catholique de Louvain

LBIRA2108

2014-2015

Plant production

4.0 credits	37.5 h + 15.0 h	1q

Teacher(s) :	Bertin Pierre ; Draye Xavier (coordinator) ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	Icampus
Prerequisites :	Mandatory skills in plant biology, plant physiology and genetics acquired during the Bachelor of bioengineer or equivalent
Main themes :	General principles of ecophysiology of major crops Biomass production and resources capture Passage from the isolated plant to the plant population Plant growth and development, yield components Morphology, phenology, physiological factors, biotic and abiotic stresses Application to several temperate, tropical and ubiquitous crops
Aims :	a. Contribution of the activity with regards to the referential of leaning outcomes Control a pool of scientific knowledge in the field of plant production (M1.1, M1.2, M2.2) Control a pool of knowledge in the fied of bioengineering through a quantitative approach, facing a complex problem of agronomy at the scales of the plant and the field (M2.4) Apply a rigorous, innovative and systematic scientific approach in order to deepen a research problem in the field of crop production (M3.3, M3.4) b . Specific formulation for this activity AA program (maximum 10) At the end of this activity, the student will be able to : · explain the life cycle of a crop and identify the activity periods of each process operating in biomass formation ; · express the principles of yield formation ; · connect processes between themselves ; · identify the key phenological stages studied during the lectures ; · compare the adequacy of different crops to defined pedo-climatic scenarii ; · predict the biomass evolution in the field during the vegetative phase ; · examine the production differences under a range of physiological and pedo-climatic constraints ; · formulate a given situation encountered in the field (e.g. a given season) in a quantitative way with the help of concepts studied during the lectures, interpret it and propose an analytical strategy in order to vallidate this interpretation. *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 examination
Teaching methods :	Oral teaching with case studies Field visits In silicomodelling
Content :	1. The plant in terms of supply and demand Generic scheme of a plant. Development, morpho-genetic sequences. Approach in terms of supply and demand. Principles of yield constitution 2. light interception, photosynthesis and allocation From the leaf to the canopy. Photosynthesis efficiency. Dry biomass distribution 3. Limiting factors and sustainable yields. Water-driven limitation. Nitrogen-driven limitations. Resources capture and yields 4. Modellingof biomass production Exercise on genotype-environment interactions 5. Temperate and ubiquitous major crops: maize, wheat, sugar beet, potato Morphology. Growth and development. Yield parameters 6. Tropical major crop: rice Morphology. Growth and development. Yield parameters. Ecology: soil, climate, abiotic stresses. Crop management

Bibliography :	Mandatory instruction material Powerpoint slides available on icampus Additional lectures Hay and Porter, 2006. The physiology of crop yield Hay RKM and Walker AJ, 1989. An introduction to the physiology of crop yield. Longman, Essex. 292 p. Smith DL and Hamel C, 1999. Crop yield. Physiology and processes. Springer, Heidelberg. 504 p.
Cycle and year of study :	> Master [120] in Agricultural Bioengineering > Master [120] in Environmental Bioengineering
Faculty or entity in charge:	AGRO