

Course Unit	nit Soil and Water Management and Conservation			Field of study	Agricultural and Animal Production/Earth Sciences		
Master in	Agroecology			School	School of Agriculture		
Academic Year	2023/2024	Year of study	1	Level	2-1	ECTS credits 6.0	
Туре	Semestral	Semester	2	Code	6348-747-1202-00-23		
Workload (hours)	162	Contact hours	T 30 TP	- PL 30 T	c - s -	E - OT 4 O -	
			I - Lectures; TP - Lectures a	nd problem-solving; PL - Problem-	solving, project or laboratory; TC -	Fieldwork; S - Seminar; E - Placement; OI - Tutorial; O - Other	

Name(s) of lecturer(s) António Castro Ribeiro, Tomás de Aquino Freitas Rosa Figueiredo

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

- It the end of the course unit the learner is expected to be able to: Identify soil degradation problems (especially those due to erosion and machine operation) Describe, select, design and plan implementation of soil conservation measures As soil conservation planners and managers, apply the built up critical capacity when taking decisions either at farm level or at wider territorial scales Implement strategies for water conservation and management of water use in agriculture. Know and use water simulation models for scheduling irrigation and water management under specific environmental conditions Know the main water quality parameters and the risks of using water of less than optimal quality Implement the best cultural practices for water conservation

- 7. Implement the best cultural practices for water conservation.

Prerequisites

Before the course unit the learner is expected to be able to: BSc level concepts on Climate, Soil Science, Agriculture, Mechanization

Course contents

-Soil degradation: agents, processes, factors and effects (focus on soil physical degradation and erosion) -Soil conservation: strategies, measures, conditions for their implementation and efficacy; soil conservation plan -Soil taxonomy and land evaluation: SROA and FAO/WRB Water conservation and management: -Crop water requirements -Irrigation management: methods and simulation models -Sustainability of irrigation systems -Water quality for irrigation -Cultural practices and water conservation

Course contents (extended version)

1. Soil degradation

- Soli degradation Degradation forms and soil erosion types: classification and description Soil erosion by water: impacts on and consequences for soil and water resources use and management Soil erosion by water: agents, processes, factors, assessment, prediction Soil erosion by wind: agents, processes, factors, assessment, control Soil physical degradation: structural degradation and soil compaction due to farm mechanization Other soil degradation forms; brief evolves Soil degradation; structural degradation forms; brief evolves Soil degradation; brief evolves Soil evolves
- Other soil degradation forms: brief overview
 Soil conservation (erosion control measures)
 - Vegetation cover: vegetation and erosion, measures classification and description, performance
- Vegetation cover: vegetation and erosion, measures classification and description, performance
 Soil and ground surface: measures classification, description and performance (focus on tillage)
 Structures: measures classification, description and performance, design (terraces, waterways)
 Special measures for erosion control: afforested areas, gullied areas, embankments
 Soil conservation strategies and plan: selection and implementation of erosion control measures
 Soil taxonomy and land evaluation
 Soil taxonomy: SROA (Portuguese) and FAO/WRB
 Land evaluation concepts
 Crop water requirements
 Measurements

- Measurement and estimation of evapotranspiration
 Reference evapotranspiration
 Crop evapotranspiration: crop coefficients
 Soil water balance and irrigation requirements
 rightion management

- S. Irrigation management
 Methods of irrigation scheduling
 Methods based on plant measurements
 Methods based on soil water measurements
- Soil water balance models Irrigation management under water scarcity: Deficit irrigation

- Imagation management under water scalety. Denot imgation
 Additional and irrigation systems
 Selection of irrigation methods
 Performance indicators for irrigation
 Sustainability of irrigation systems
 Water conservation and management strategies for agriculture
 Strategies at soil level
 Strategies at soil level

 - Strategies at crop level: water use efficiency Management and conservation under specific environmental conditions

- Water scarcity and drought
 Water quality for irrigation
 Physical and chemical quality
 Salinity. The use of salty water for irrigation
 Reuse wastewater for irrigation
- Recommended reading
- 1. Allen, R. G., Pereira, L. S., Raes, D., Smith, M., 1998. Crop evapotranspiration. Guidelines for computing crop water requirements. FAO Irrigation and Drainage
- Allen, R. G., Pereira, L. S., Kaes, D., Striutt, M., 1990. Orde evaporatiophration. Concentration of the second paper 56, Rome.
 Greppi, M. & Preti, F. 1999. Water quality in agriculture. In: H. N. van Lier, L. S. Pereira, F. R. Steiner (eds.) CIGR Handbook of Agricultural Engineering, Vol I, ASAE, St. Joseph, MI: 507-544.
 Morgan, R. P. C., 2005. Soil Erosion and Conservation, 3^a ed. Blackwell, Oxford, UK.
 Sheng, T. C. 1989. Soil conservation for small farmers in the humid tropics. FAO Bulletin nº 60, Rome.
 Tanji, K. K. & Yaron, B. 1994. Management of water use in agriculture. Advanced Series in Agricultural Sciences, Springer-Verlag, Berlin.

Teaching and learning methods

Theoretical lectures are oral presentations, support material is provided to students at the beginning of semester. Practicals comprise guided activities, support material for practical exercises are provided to students alng the semester. Practicals include lab and field work in the Campus. Tutorial aid provided along the semester and during exams.

Assessment methods

Alternative 1 - (Regular, Student Worker) (Final, Supplementary, Special)

 Practical Work - 80% (Tasks developed in each block of the programme, weighted according to block extent.)
 Intermediate Written Test - 20% (Complementary assessment, compulsory for students not achieving positive results in Practicals.)

 Alternative 2 - (Regular, Student Worker) (Final, Supplementary, Special)

 Final Written Exam - 100% (For students not selecting/fulfiling requirements of/achieving positive mark in Alternative 1.)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation			
António Castro Ribeiro, Tomás de Aquino Freitas Rosa Figueiredo	Felícia Maria Silva Fonseca	Manuel Ângelo Rosa Rodrigues	José Carlos Batista Couto Barbosa
17-01-2024	17-01-2024	17-01-2024	17-01-2024