INSTITUTO POLITÉCNICO DE BRAGANÇA

Course Unit	Sustainable Herbaceous Agriculture			Field of study	Agricultural and Animal Production		
Master in	Agroecology			School	School of Agriculture		
Academic Year	2023/2024	Year of study	1	Level	2-1	ECTS credits	6.0
Type	Semestral	Semester	2	Code	6348-747-1204-00-23		

Workload (hours)	162	Contact hours	T	TP	PL	TC	S	E	OT	O
			30	-	30	-	-	-	4	-

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s): Jaime Camilo Afonso Maldonado Pires, Manuel Ângelo Rosa Rodrigues

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. To understand the growing process of a species integrated in a vegetal community.
2. To enable for the innovation and for the application of technical and scientific knowledge in this field.
3. Identify areas where further research is need and be able to participate on it
4. To search for alternatives to the conventional crops or new uses for the current crops, such as raw-materials for biofuels, fibers, etc.
5. To enable for the implementation of the best management practices in order to reduce environmental impacts.
6. Knowing the most important horticultural crops for human diet. Production and post-harvest technology.

Prerequisites

Before the course unit the learner is expected to be able to:
1. General knowledge on botany
2. General knowledge on plant physiology
3. General knowledge on soils and soil fertility
4. General knowledge on agro-climatology

Course contents

The horticultural setor. Large scale grain productions. Cropping techniques. Crop rotation and extensive agriculture as the basis of sustainability. Energy crops and biofuels. Tillage systems: energy, water resources, carbon sequestration, soil conservation. The evergreen systems: cover crops, catch crops and intercropping. Legumes in crop rotations. Biological nitrogen fixation. Alternative farming systems and in situ conservation of plant genetic resources. Horticultural crops.

Course contents (extended version)

1. Integrated crop production
   - The horticultural and agro-industrial sectors. Agroecological strategies for these farming systems
   - The large scale grain production. Crop rotation and extensification as the basis of sustainability.
   - Energy crops and biofuels. Ecological importance of biofuels
   - Aromatic and medicinal plants. Collection in nature vs cultivation.
2. Conservation agriculture
   - Tillage systems: energy, water resources, carbon sequestration, soil conservation
   - The evergreen systems: cover crops, catch crops and intercropping
   - Legumes in crop rotations and green manures. Biological nitrogen fixation. Symbiotic systems.
   - Role of alternative farming systems for in situ conservation of plant genetic resources.
   - Plant breeding for maximum yield, production stability, quality, resistance environmental stresses.
3. Detailed study of some horticultural crops
   - The main horticultural crops of the brassicaceae, fabaceae and alliaceae families
   - Topics to be developed in each crop:
   - Importance and productivity
   - Morphology and physiology
   - Soil and climatic requirements
   - Cultural practices
   - Major pests, diseases and physiological disorders
   - Harvest and post-harvest technology

Recommended reading

1. Trenkel. 2010. Ullmann's Agrochemicals. Vol. 3. Fertilizers. pp 1-142. Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim.
2. Francis, C. , Flora, C. , King, L. 1990. Sustainable Agriculture in temperate zones. John Wiley & Sons, Inc. , New York.
3. Fuller, G. , McKeon, T. , Bills, D. 1996. Agricultural materials as renewable resources. Non-food and industrial applications. Am. Chem. Soc. Washington, DC.
4. Finch, H. J. S. , Samuel, A. M. , Lan, G. P. L. 2014. Lockhart & Wiseman's Crop Husbandry including grasslands. Woodhead publ. , UK.
5. Almeida, D. 2006. Manual de culturas hortícolas. Vol I e Vol II. Editorial Presença, Queluz de Baixo, Barcarena.

Teaching and learning methods

Introduction of theoretical contents by using audio-visual equipment and blackboard. Establishment of field experiments. Plant material sampling and processing. Seminar preparation, from experimental results and bibliographical searching. Results presentation as written reports and oral communications. Technical study visits.

Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final)
   - Final Written Exam - 50% (Written exam of the theoretical component)
   - Experimental Work - 50% (Practical experiments, studies and reports)
2. Alternative 2 - (Regular, Student Worker) (Supplementary)
   - Final Written Exam - 50% (Written exam of the theoretical component)
   - Experimental Work - 50% (Working students can fulfill the component simultaneously with the written test.)
3. Alternative 3 (worker-students) - (Student Worker) (Special)
   - Final Written Exam - 55% (Written exam of the theoretical component)
   - Experimental Work - 45% (Practical evaluation or a substitution test)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

Jaime Camilo Afonso Maldonado Pires, Manuel Ângelo Rosa Rodrigues	Arlindo Castro Ferreira Almeida	Manuel Ângelo Rosa Rodrigues	José Carlos Batista Couto Barbosa
19-01-2024	19-01-2024	19-01-2024	20-01-2024