INSTITUTO POLITÉCNICO DE BRAGANÇA

Course Unit	Protected Crops			Field of study	Animal and Agricultural Productions								
Bachelor in	Agronomic Engineering			School	School of Agriculture								
Academic Year	2022/2023	Year of study	3	Level	1-3	ECTS credits	6.5						
Type	Semestral	Semester	2	Code	9086-307-3202-00-22								
Workload (hours)	175,5	Contact hours	T 30	TP -	PL 30	TC -	S -	E -	OT 20	O -			

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): Álvaro José Lopes César

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Prepare the students for the identification of species, vegetable seeds, cut flowers and foliage.
2. Prepare the students for the preparation and handling substrates for potted plants and nursery.
3. Prepare the students for mastering the theoretical principles and managing the processes of environmental control in greenhouses and shelters.
4. Prepare the students for mastering the cropping techniques under greenhouse conditions

Prerequisites

Before the course unit the learner is expected to be able to:
1. General knowledge on botany
2. General knowledge on crop physiology
3. General knowledge on plant nutrition and soil fertility

Course contents

Concept of protected crops. Economical importance of crops cultivated in greenhouses. Development and perspectives. Exigencies of market and species diversification. Factors to consider when choosing greenhouses. Environmental control in greenhouses. Nurseries - reasons for its use. Characteristics of substrates and seeds. Cropping technique associated to horticultural crops growing in greenhouses.

Course contents (extended version)

1. Crop production in greenhouses
   - Concepts; main crops; major producing regions, economic and social importance; perspectives.
2. Nurseries for horticulture
   - Seeds and vegetative propagation organs; nurseries; transplantation; pots and substrates.
3. Shelters for growing crops
   - Building types; environmental conditioning.
4. Greenhouses
   - Structures and coverings; environmental conditioning, special techniques of cultivation; hydropinics
5. Crops grown under greenhouses
   - Lettuce: varieties, cultural cycle; agro ecological adaptation; nurseries; cropping techniques.
   - Tomatoes: varieties, cultural cycle; agro ecological adaptation; nurseries; cropping techniques.
   - Carnation. Varieties. Cultural cycle. Installation. Cultural techniques.

Recommended reading

1. Russell, J. 2011. The polytunnel book. Fruit and vegetables all year round. Frances Lincoln Limited, London, UK
2. Cermeño Z. , 1990. Estufas. Instalações e maneio. 1ª Ed. Litexa Eds. , Lisboa. 355 pp.
3. Resh, H. M. , 2013. Hydroponic food production. 7th ed. , CRC Press, New York, USA.
4. Almeida, D. 2006. Manual de Culturas Hortícolas. Vol. I e II. Editorial Presença, Queluz de Baixo
5. Maroto, J. V. 2000. Horticultura Herbacea Especial. 4th Ed. Ediciones Mundi-Prensa, Madrid.

Teaching and learning methods

Theoretical classes and practical classes with work in the classroom or in greenhouses. Documentary research to monitor work and for consolidation of knowledge.

Assessment methods

1. Alternative 1- Final Written Exam - 100% - (Regular, Student Worker) (Final)
2. Alternative 2- Final Written Exam - 100%. - (Regular, Student Worker) (Supplementary, Special)

Language of instruction

Portuguese

Electronic validation

Álvaro José Lopes César	Manuel Ângelo Rosa Rodrigues	Albino António Bento	José Carlos Batista Couto Barbosa
13-12-2022	13-12-2022	20-12-2022	20-12-2022