

Course Unit	Plant Physiology	Field of study	Biology and biochemistry
Bachelor in	Biology and Biotechnology	School	School of Agriculture
Academic Year	2023/2024	Year of study	2
Type	Semestral	Semester	1
Workload (hours)	162	Contact hours	T - TP - PL - TC - S - E - OT - O -
		Level	1-2
		ECTS credits	6.0
		Code	9029-782-2103-00-23

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) Ana Maria Antão Gerales

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
Be acquainted with biochemical and physiological processes in plants. Understand water, nutritional and energy relations as well as plant growth and development, response to stresses.

Prerequisites

Before the course unit the learner is expected to be able to:
Have Previous knowledge on Biology, Biochemistry, Chemistry and Physics

Course contents

1. Water relations 2. Transpiration 3. Nutrition 4. Photosynthesis 5. Photorespiration 6. Plant Growth and development 7. Plant Ecophysiology 8. Plant secondary metabolism 9. Plant response to stresses.

Course contents (extended version)

1. Water in plants. Main biological functions. Diffusion, mass flow and osmosis.
2. Water potential. Soil-plant-atmosphere system. Water absorption by the plant. Water in xylem.
3. Transpiration. Stomata physiology. Environmental /physiological control of stomata functioning.
4. Physiological/ environmental factors influencing transpiration. Photosynthesis/transpiration ratio
5. Nutrition. Essential mineral elements. Macronutrients and micronutrients. Functions and deficiency.
6. Transport in phloem: structure and transport mechanisms.
7. Photosynthesis. Structure of Photosynthetic system. Regulation of Photosynthetic Process.
8. Plants C3, C4, CAM. RubisCO: Structure and regulation. Photorespiration.
9. Factors affecting photosynthesis : Light, Temperature, CO2 and water availability.
10. Shade/Sun plants. Responses of C3, C4 and CAM plants to light, temperature CO2 and to water amounts
11. Plant Growth and development.
12. Phytohormones: Physiological role. How environment influences phytohormones action.
13. Biological and physiological functions of the plant phytochrome
14. Plant Secondary metabolites: characteristics and functions
15. Physiological stress. Structural and functional mechanisms of plant response to stressors.

Recommended reading

1. AZCÓN-BIETO, J. & TALÓN, M. (2ed.) (2008): Fundamentos de Fisiología Vegetal. Interamericana-McGraw-Hill, Madrid.
2. JAIN, V K (2022) Fundamentals Of Plant Physiology (20th Edition) S. CHAND PUBLISHING
3. RAVEN PH, EVERT RFC & EICHHORN SE (2012). Biology of Plants. 8th ed. , W. H. Freeman and Company. New York
4. TAIZ, L; MURPHY, A. MOLLER IM E ZEIGER E (2021) Fundamentos de Fisiologia Vegetal Artmed Editora
5. TAIZ L & ZEIGER E (2014) Plant Physiology. 6th ed. Sinauer Associates /online version: <http://5e.plantphys.net/index.php>.

Teaching and learning methods

Theoretical lectures with expositive methods, utilization of audio-visual resources. Laboratorial practical exercises

Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final)
 - Presentations - 25%
 - Final Written Exam - 75% (The minimum grade for the written exam must be at least 8.5.)
2. Alternative 2 - (Regular, Student Worker) (Supplementary, Special)
 - Final Written Exam - 100%

Language of instruction

Portuguese

Electronic validation

Ana Maria Antão Gerales	Maria João Almeida Coelho Sousa	Altino Branco Choupina	Paula Cristina Azevedo Rodrigues
21-01-2024	23-01-2024	24-01-2024	25-01-2024