Course Unit	Plant Physiology		Field of study	Biology and biochemistry	
Bachelor in	Biology and Biotechnology		School	School of Agriculture	
Academic Year	2019/2020	Year of study 2	Level	1-2	ECTS credits 6.0
Type	Semestral	Semester 1	Code	9029-510-2103-00-19	

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 - Tuturial; O - Other

Name(s) of lecturer(s): Ana Maria Antão Geraldes

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 Photosyntetic system. Regulation of Photosyntetic 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. Phytoregulators: Physiological role. How environment influences phytoregulators 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. HOPKINS WG & HUNER NPA (2008). Introduction to Plant Physiology. 4rd ed. , John Wiley & Sons, Inc, New York.
3. RAVEN PH, EVERT RFC & EICHHORN SE (2012). Biology of Plants. 8th ed. , W. H. Freeman and Company. New York
4. SALISBURY FB & ROSS C (2000). Fisiología de las plantas. 3 volumes Paraninfo
5. TAIZ L & ZEIGER E (2010) Plant Physiology. 5th 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. Coursework (mandatory for ordinary students) - (Regular) (Final)
   - Intermediate Written Test - 50% (Short pratical examinatitions (25%) Final written exam (75%). The final mark must be 9. 5.)
   - Final Written Exam - 50% (Final written exam (theoretical) The final classification must be 9. 5.)
2. Worker Student - (Student Worker) (Final)
   - Practical Work - 50% (Final written exam The final classification must be 9. 5.)
   - Final Written Exam - 50% (Final written exam The final classification must be 9. 5.)
3. Suplementary exams - (Regular) (Supplementary, Special)
   - Practical Work - 50% (Final written exam The final classification must be 9. 5)
   - Final Written Exam - 50% (Final written exam (theoretical) The final classification must be 9. 5.)

Language of instruction

Portuguese

Electronic validation

Ana Maria Antão Geraldes	Maria João Almeida Coelho Sousa	Joaquina Teresa Gaudêncio Dias	Maria José Miranda Arabolaza
07-11-2019	09-11-2019	11-11-2019	11-11-2019