



PLANT PHYSIOLOGY

Enrollment year	2017/2018
Academic year	2019/2020
Regulations	DM270
Academic discipline	BIO/04 (PLANT PHYSIOLOGY)
Department	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
Course	BIOLOGICAL SCIENCES
Curriculum	PERCORSO COMUNE
Year of study	3°
Period	1st semester (01/10/2019 - 14/01/2020)
ECTS	9
Lesson hours	72 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	BALESTRAZZI ALMA (titolare) - 9 ECTS
Prerequisites	It is required the knowledge of the contents of the courses of Botany and especially of Biochemistry in particular of protein, carbohydrates and lipid chemistry, enzymology, respiratory metabolism, redox reactions
Learning outcomes	At the end of the course, students should have learned and fully understood the specific biological structures of plants and the biochemical peculiarities which confer them the capacity of sustaining life on this planet
Course contents	Autotrophic way of life and its consequences on structure and physiology of plants. Peculiarities of plant cell: cell wall, vacuoles, plastids and their roles. Milestones in the research on photosynthesis. Primary steps of photosynthesis: organization of the photosynthetic membrane, light harvesting, photochemical reactions, electron flow,

ATP synthesis and NADP⁺ reduction. CO₂ organization: Calvin cycle, RuBisCO. Regulation of Calvin cycle. Photorespiration, C₄ plants and CAM plants. Primary products of photosynthesis and phloematic transport. Ecophysiological aspects of photosynthesis. Peculiarities of the respiratory metabolism and of mitochondria of plants. Homeostasis maintenance in plant cell; ATPase, membrane transporters and channels. Seed maturation and germination. The reserve compounds and their degradation. Seeds and man and animal nutrition. Plant, soil and water. Micro and macro nutrients. Flux of nutrients in the xylematic vessels. Assimilative reduction and organization of nitrogen and sulfur. The environmental signals and their transduction in plants. Phytochrome and photomorphogenesis. Other receptors. The phytohormones: perception, signal transduction and physiological effects. Secondary metabolites of plants and their environmental roles. Agriculture, environment and biotechnologies. The genetic improvement of plants: from crossing to transgenic plants.

Teaching methods

Frontal lessons.
There will be two written exercises during the course where students can evaluate their own level of preparation and understanding of the subjects of the course by answering a series of multi-answer questions

Reccomended or required readings

Taiz e Zeiger
Elementi di Fisiologia vegetale
Riduzione della quinta edizione di lingua inglese. PICCIN editore, 28 euro
More detailed :
Buchanan, Gruissem, Jones
Biochimica e Biologia molecolare delle Piante, Zanichelli editore, 2003, 129 euro

Assessment methods

The course exam is written and is made up by both general questions and "open" more specific questions as well as a few questions multiple-answer. In answering such questions, the student must demonstrate to have developed a precise idea, a mental schema of how it works a plant organism, but also to know in detail some notions about processes and molecules, reactions and basic structures which are fundamental in plant physiology

Further information

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Sustainable development goals - Agenda 2030

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