

General information	
Academic subject	Plant Ecophysiology
Degree course	<i>Environmental Biology</i>
Academic Year	<i>I</i>
European Credit Transfer and Accumulation System (ECTS)	6
Language	<i>Italian</i>
Academic calendar (starting and ending date)	<i>First week of March Third week of June (second semester)</i>
Attendance	<i>mandatory frequency</i>

Professor/ Lecturer	
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Department and address	<i>Department of Biology Via Orabona, 4 70125 Bari (Italy)</i>
Virtual headquarters	<i>Team code: 5ko7f9s</i>
Tutoring (time and day)	Tuesday 12-14. Or by appointment agreed by e-mail. Place: Botanical building, second floor room 21

Syllabus	
Learning Objectives	Knowledge of the responses of plants to the environment and of the utilization of plants for the evaluation and / or solution of some environmental problems
Course prerequisites	Basic knowledge of botany and plant physiology
Contents	<p>Photosynthesis and productivity Environmental aspects of photosynthesis Photosynthesis of aquatic organisms and bacteria Seed ecophysiology: mechanisms of development, dispersion and germination of seeds. Seeds and dehydration: Orthodox and recalcitrant seeds Quiescence and Dormancy of the seeds. Viviparous seeds and their functional significance. The language of plants: secondary metabolism of plants: terpenoids, alkaloids, phenolic Plants and stress. Abiotic stresses. Oxidative stress and antioxidant systems Biotic stress: physiological bases of plant pathogen interactions. Plant biotechnologies in relation to the environment. Genetically modified plant organisms: physiological and environmental aspects The phytoremediation. Sustainable energy production. Biomonitoring through plant organisms. Active and passive biomonitoring techniques</p> <p>Laboratory experience: Responses to an abiotic stress in a model system: (Preparation of a cell culture, microscope observations and evaluations of morphologic and metabolic parameters in relation to stress responses)</p>
Books and bibliography	<p>Taiz & Geiger Fisiologia Vegetale, Piccin,</p> <p>To consult for some topics: Rascio e AA:VV. Elementi di Fisiologia vegetale EdiSes ;2017</p>

	G. Pasqua. Biologia cellulare e biotecnologie vegetali, Piccin
Additional materials	To complete and acquire further information on plant ecophysiology, the teacher can provide, at the request of the student, bibliographic indications and scientific articles on specific topics

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
50	44	6	100
ECTS			
6	5,5	0,5	
Teaching strategy			
Frontal lessons with multimedia supports, laboratory exercises			
Expected learning outcomes			
Knowledge and understanding on:	Knowledge of <ul style="list-style-type: none"> ○ the responses of plants to the environment ○ responses to plant stress 		
Applying knowledge and understanding on:	Ability to <ul style="list-style-type: none"> ○ apply the knowledge of the physiological mechanisms of plants in a global view of ecosystems and in relation to specific environmental problems. 		
Soft skills	<ul style="list-style-type: none"> • <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> ○ Ability to evaluate and interpret the acquired knowledge • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ Acquisition of a correct scientific language to explain in a synthetic and clear way topics concerning the functions of plant organisms in relation to environmental parameters • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ Ability to understand the relationships between form-environment-function in relation to environmental parameters, to study specific environmental issues and to update the information acquired on the basis of scientific literature.. 		

Assessment and feedback	
Methods of assessment	The student's assessment includes an oral test with at least three questions. During the course, two self-assessment tests could be carried out with some multiple choice and open answer questions in order to control students' learning
Evaluation criteria	<ul style="list-style-type: none"> • <i>Knowledge and understanding</i> <ul style="list-style-type: none"> ○ The student must demonstrate to know all the contents of the course and in particular the environmental aspects of photosynthesis, seed physiology, stress response with particular attention to oxidative stress, the use of plants in biomonitoring and phytoremediation techniques. Knowledge of these topics is essential for passing the examination test. • <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> ○ The student will be able to create simple but significant connections between the topics of plant ecophysiology and those of other disciplines, such as applied botany and ecology



	<ul style="list-style-type: none">• <i>Autonomy of judgment</i><ul style="list-style-type: none">○ The student will have to face environmental problems on the basis of scientific data• <i>Communicating knowledge and understanding</i><ul style="list-style-type: none">○ The student will be able to create simple but significant connections between the topics of plant ecophysiology• <i>Communication skills</i><p>The student should be able to express concepts and formulate interpretations with a proper and clear language.</p>• <i>Capacities to continue learning</i><ul style="list-style-type: none">○ The student will be able to read literature and update their knowledge on the topics of plant physiology and ecophysiology
Criteria for assessment and attribution of the final mark	<p>The student will have to demonstrate:</p> <ul style="list-style-type: none">a) knowledge and understanding of the basic contentsb) ability to explain clearly and concisely topics using an appropriate languagec) connect the topics with logical reasoning. <p>The evaluation of examination test score is given by a vote expressed in thirtieth. In the evaluation of the exam test the following elements will taken into account:</p> <ol style="list-style-type: none">1. Specific knowledge2. Language properties3. Ability to link topics4. Possible positive outcome of ongoing checks5. Active participation in the laboratory activities and brief report on the laboratory activity <p>The satisfaction of the aspects (No. 1,2,3) is a necessary and sufficient condition for passing the examination test and obtaining an appropriate evaluation. The maximum mark will be given to students whose tests fully satisfy all the aspects (1-5) listed above.</p> <p>During the exam, the student must show the acquisition of critical skills and the ability to adequately discuss simple problems already proposed during the course and the laboratory by the teacher.</p>
Additional information	