

Main course information	
Academic subject	Plant ecophysiology
Degree course	Environmental Biology
Degree class	LM/6
ECTS credits (CFU)	6
Compulsory attendance	yes
Teaching language	Italian
Accademic Year	2019/2020

Professor/Lecturer	
Name & SURNAME	Franca Tommasi
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Tutorial time/day	Tuesday 12-14; or by appointment agreed by e-mail. Place: Botanical building, second floor room 21.

Course details	Pass-fail exam/	SSD code	Type of class
	Exam with mark out of 30	Bio04	Lecture/workshop/laboratory

Teaching schedule	Year	Semester
	I	II

Lesson type	CFU/ECTS	Lessons (hours)	CFU/ECTS lab	Lab hours	CFU/ECTS tutorial/workshop	Tutorial/workshop hours	CFU/ECTS field trip	Field trip Hours
		6	50	0.5	6	0	44	0

Time management	Total hours	Teaching hours	Self-study hours
	150	50	100

Academic Calendar	First lesson	Final lesson
	First week of March	Third weeks of June

Syllabus	
Course entry requirements	Basic knowledge of botany and plant physiology
Expected learning outcomes (according to Dublin Descriptors) (it is recommended that they are congruent with the learning outcomes contained in A4a, A4b, A4c tables of the SUA-CdS)	
<i>Knowledge and understanding</i>	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.
<i>Applying knowledge and understanding</i>	Ability to apply the knowledge of the physiological mechanisms of plants in a global view of ecosystems and in relation to specific environmental problems.
<i>Making informed judgements and choices</i>	Ability to evaluate and interpret the acquired knowledge.
<i>Communicating knowledge and understanding</i>	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>	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.

Syllabus	
Course content	Photosynthesis and productivity Environmental aspects of photosynthesis Photosynthesis of aquatic organisms and bacteria

	<p>Seed ecophysiology: mechanisms of development, dispersion and germination of seeds. Seeds and dehydration: Orthodox and recalcitrant seeds</p> <p>Quiescence and Dormancy of the seeds. Viviparous seeds and their functional significance.</p> <p>The language of plants: secondary metabolism of plants: terpenoids, alkaloids, compounds phenolic</p> <p>Plants and stress. Abiotic stresses.</p> <p>Oxidative stress and antioxidant systems</p> <p>Biotic stress: physiological bases of plant pathogen interactions.</p> <p>Plant biotechnologies in relation to the environment.</p> <p>Genetically modified plant organisms: physiological and environmental aspects</p> <p>The phytoremediation.</p> <p>Sustainable energy production.</p> <p>Biomonitoring through plant organisms. Active and passive biomonitoring techniques</p> <p>Laboratory experience:</p> <p>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>
Course books/Bibliography	<p>Taiz & Geiger Fisiologia Vegetale, Piccin,</p> <p>To consult for some topics: Rascio e AA:VV. Elementi di Fisiologia vegetale EdiSes ;2017 G. Pasqua. Biologia cellulare e biotecnologie vegetali, Piccin</p>
Notes	<p>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.</p>
Teaching methods	<p>Frontal lessons with multimedia supports, laboratory exercises</p>
Assessment methods (indicate at least the type written, oral, other)	<p>The student's assessment includes an oral test with at least three questions. During the course, two self-assessment tests will be carried out with some multiple choice and open answer questions in order to control students' learning.</p>
Evaluation criteria (Explain for each expected learning outcome what a student has to know, or is able to do, and how many levels of achievement there are)	<p>The student will have to demonstrate:</p> <ol style="list-style-type: none"> knowledge and understanding of the basic contents ability to explain clearly and concisely topics using an appropriate language 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"> Specific knowledge Language properties Ability to link topics Possible positive outcome of ongoing checks 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> <p>The expected learning outcomes are detailed below.</p> <p>Knowledge and understanding</p>

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.

Ability to apply knowledge and understanding
 The student will be able to create simple but significant connections between the knowledge of plant ecophysiology and those of other disciplines such as applied botany and ecology..

Autonomy of judgment
 The student will be able to create simple but significant connections between the basic topics of plant ecophysiology.

Communication skills
 The student will be able to express concepts and formulate interpretations with a proper and clear language.
 All these skills guarantee a very positive assessment of the student's preparation and performance.

Further information