



UNIVERSITÀ  
DEGLI STUDI DI BARI  
ALDO MORO

DIPARTIMENTO DI  
SCIENZE DEL SUOLO, DELLA  
PIANTA E DEGLI ALIMENTI

LAUREA MAGISTRALE IN  
MEDICINA DELLE PIANTE  
INTERNATIONAL JOINT MASTER DEGREE IN  
PLANT MEDICINE



General information	
Academic subject	<b>Plant physiology (Module of I.C. Plant physiology and physiopathology)</b>
Degree course	Master's degree Plant Medicine (LM69)
Academic Year	2021-2022 (First year - First semester)
European Credit Transfer and Accumulation System (ECTS)	3
Language	Italian (English will be used when required for foreign students into didactic material)
Academic calendar (starting and ending date)	September 27 <sup>th</sup> 2021-January 21 <sup>st</sup> 2022 (Pause 2021 November 22 <sup>nd</sup> – December 3 <sup>rd</sup> , for midterm exam)
Attendance	It is no compulsory

Professor/ Lecturer	
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Department and address	DISSPA, Section of Chemistry and Biochemistry, 1 <sup>st</sup> floor, room # 5
Virtual headquarters	Microsoft teams, Zoom or other apps
Tutoring (time and day)	Any day, upon reservation, at professor's office or online

Syllabus	
<b>Learning Objectives</b>	The course aims to provide in-depth knowledge about: - the metabolic and evolutionary integration of the plant and its functions through the study of hormonal pools and the pathways of perception and signal transduction; - plant-environment relationships about the physiological role of macro- and micronutrients
<b>Course prerequisites</b>	Knowledge of plant physiology required for admission to the Master of Science degree program in Plant Medicine
<b>Contents</b>	<ul style="list-style-type: none"> <li>o Signal transduction: signal receptors in plant cells, main cellular transduction pathways, signal transduction in plants.</li> <li>o Phytochrome: structure, biochemical and photochemical properties, mechanisms of action, plant response modulated by phytochrome, ecological implications.</li> <li>o Blue light photoreceptors: structure and mechanisms of action of cryptochromes, phototropins, and zeaxanthin; plant responses to blue light.</li> <li>o Secondary metabolites: terpenoids, phenolic compounds, nitrogen containing secondary metabolites. Structure, biosynthesis, biological role. Extraction and quantification of anthocyanins from plant samples, and evaluation of colour changing according to pH.</li> <li>o Plant hormones: auxins, gibberellins, cytokinins, abscisic acid, ethylene. Structure, biosynthesis and deactivation, transduction pathways, physiological effects. Applications of phytormones in agriculture: focus on plant growth regulators and biostimulants.</li> <li>o Stress physiology: stress induced by water deficit, freezing and chilling, heat, oxygen deficit, salinity, UV radiation. Damage induced by stress on plants; strategies adopted by plants to cope with abiotic stress.</li> </ul>
<b>Books and bibliography</b>	Taiz L., Zeiger E., Plant Physiology, 5th Edition, Sinauer Associates, 2012
<b>Additional materials</b>	Notes of the lectures, scientific papers and didactic materials distributed during the course.



	<p>Suggested websites for further information:</p> <ul style="list-style-type: none"> <li>o <a href="http://treccani.it/enciclopedia/fisiologia-delle-piante_(Enciclopedia-della-Scienza-e-della-Tecnica)/">http://treccani.it/enciclopedia/fisiologia-delle-piante_(Enciclopedia-della-Scienza-e-della-Tecnica)/</a></li> <li>o <a href="http://www.plantphysiol.org/">http://www.plantphysiol.org/</a></li> <li>o <a href="https://www.frontiersin.org/journals/plant-science/sections/plant-physiology#">https://www.frontiersin.org/journals/plant-science/sections/plant-physiology#</a></li> </ul>
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Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
<b>Hours</b>			
75	16	14	45
<b>ECTS</b>			
3	2	1	
<b>Teaching strategy</b>		Lectures are held through Power Point presentations	
<b>Expected learning outcomes</b>			
<b>Knowledge and understanding on:</b>		<ul style="list-style-type: none"> <li>o Attainment of an in-depth knowledge of plant physiology useful to understand the interactions between plant and environment, with a specific focus on the main abiotic factors influencing plant growth and productivity</li> </ul>	
<b>Applying knowledge and understanding on:</b>		<ul style="list-style-type: none"> <li>o Ability to identify and control the mechanisms naturally used by plants to cope with the surrounding abiotic environment, in order to improve both plant growth and productivity</li> </ul>	
<b>Soft skills</b>		<ul style="list-style-type: none"> <li>• <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> <li>o Ability to analyze the interactions occurring between plant and abiotic environment and, consequently, to schedule and manage useful measurements to enhance both quality and yield of crop productions</li> </ul> </li> <li>• <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> <li>o Capability to communicate clearly and exhaustively the acquired knowledge, using an appropriate technical and scientific language</li> </ul> </li> <li>• <i>Capacities to continue learning</i> <ul style="list-style-type: none"> <li>o Ability to understand and elaborate critically the contents of the course, and put in relation the information learned and the scientific background acquired during the university educational path</li> </ul> </li> </ul> <p>Expected learning outcomes, as knowledge and ability, are reported in the annex A of the Didactic Regulation of the course Plant Medicine (expressed by European Descriptors)</p>	

Assessment and feedback	
Methods of assessment	<p>The final examination is an oral verification (at least three questions) of the knowledge of topics presented during the theoretical and practical lessons, as reported in the Didactic Regulation of the Master course in Plant Medicine (art.9) and in the didactic plan (annex A).</p> <p>The knowledge and skills acquired by the student are evaluated using the criteria indicated in Annex A of Didactic Regulation of the Master course in Plant Medicine.</p>



	<p>Students attending the first year of the Master's degree course are allowed to register for an intermediate oral test, whose result is valid for one academic year. In this case, the result will be calculated as the average between the result of the intermediate test and the result of the final examination.</p> <p>Oral examination of foreign students is carried out in English.</p>
Evaluation criteria	<ul style="list-style-type: none"> <li>• <i>Knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ In-depth knowledge of plant physiology to understand the interactions between plants and environment</li> <li>○ Comprehension of (i) the effects of abiotic factors on plant growth and productivity, and (ii) the strategies adopted by plants to cope with extreme environmental conditions</li> </ul> </li> <li>• <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ Ability to identify and control the mechanisms naturally used by plants to cope with the surrounding environment, to enhance plant growth and increase crop yields</li> <li>○ Knowledge of the main applications in agriculture of plant metabolites (hormones, secondary metabolites)</li> </ul> </li> <li>• <i>Autonomy of judgment</i> <ul style="list-style-type: none"> <li>○ Ability to analyze, both in laboratory and in field, the interactions between plant and abiotic environment to schedule and manage useful measurements to improve both quality and yields of crop productions</li> </ul> </li> <li>• <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ High coherence with the contents of the course, correct use of technical and scientific language, ability to create connections with the knowledge already acquired in previous courses</li> </ul> </li> <li>• <i>Communication skills</i> <ul style="list-style-type: none"> <li>○ Ability to organize the acquired knowledge in form of didactic presentation and to articulate it for didactic purposes</li> </ul> </li> <li>• <i>Capacities to continue learning</i> <ul style="list-style-type: none"> <li>○ Ability to understand and elaborate critically the contents of the course searching for further details and updates</li> </ul> </li> </ul>
Criteria for assessment and attribution of the final mark	<p>The final grade is given in thirtieths. The exam is considered passed when the grade is greater than or equal to 18. <b>The evaluation of the student is based on criteria previously fixed such as reported in the Annex A of the Didactic Regulation of the Master Course in Plant Medicine.</b></p>
<b>Additional information</b>	