

General information	
Academic subject	BIO/04 Methodologies
Degree course	<i>Biological Sciences</i>
Academic Year	<i>2021/2022</i>
European Credit Transfer and Accumulation System (ECTS)	5 (3 CFU Lectures+ 2 CFU workshop)
Language	<i>Italian</i>
Academic calendar (starting and ending date)	<i>March 1-June 10, 2022</i>
Attendance	<i>Yes</i>

Professor/ Lecturer	
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Virtual headquarters	<i>Bari</i>
Tutoring (time and day)	Monday-Friday 11,00-13,00 or by appointment

Syllabus	
Learning Objectives	<i>Acquisition of knowledge of plant biology necessary to understand experimental methods, protocols and approaches in the plant-physiology field</i>
Course prerequisites	<i>Knowledge of Plant Biology</i>
Contents	<p>Lectures</p> <p><i>In vitro cultures: definition and its characteristics. Composition of a culture medium and development of an in vitro culture. Totipotency of the plant cell. Plant regeneration. In vitro micropropagation. Direct and indirect organogenesis and embryogenesis. Somaclonal variation. Protoplasts. Protoplast fusion. Synthetic seeds. Haploid plants. Vegetable callus. Cell cultures. Production of secondary metabolites from cell cultures.</i></p> <p>Laboratory</p> <p><i>The laboratory activities are conducted in parallel with the topics of the lectures. In vitro plant culture experiments in solid and liquid media. Preparation of the culture medium. Weigh of all the substances to set up a culture medium using analytical and preparative balances. Weigh of micro- and macroelements. Bring the culture medium to pH and final volume. Addition of agar. Use of the autoclave for liquid medium sterilization. Distribution of the liquid medium in plate. Callus culture plates. Preparation of vegetable explants. Calluses from different plant explants. Observation and description of plant callus cultures. Preparation of the culture medium in glass tubes for seed germination in vitro. Sterilization of seeds and their in vitro germination. Isolation of protoplasts from leaves of tomato plants grown in a growth chamber. Sowing, rearing and sample collection. Preparation of solutions. Observation and yield of the protoplasts under the microscope.</i></p>
Books and bibliography	<p><i>Lecture notes</i></p> <p><i>Book- Barcaccia-Falcinelli: Genomica e Biotecnologie genetiche vol. III - Liguori</i></p>



	<i>Editore</i>
Additional materials	<i>Lecture Power Points are available as support to the study</i>

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
<i>125</i>	<i>24</i>	<i>24</i>	<i>77</i>
ECTS			
<i>5</i>	<i>3</i>	<i>2</i>	
Teaching strategy		<i>Lectures with the use of PowerPoint. Continuous verbal interactions during lectures</i>	
Expected learning outcomes			
Knowledge and understanding on:	<ul style="list-style-type: none"> ○ Acquisition of knowledge of plant biology necessary to understand experimental methods and protocols in the plant field 		
Applying knowledge and understanding on:	<ul style="list-style-type: none"> ○ The theoretical acquisitions (carried out in the classroom) and practices (carried out in the laboratory) allow carrying out complex methodological and instrumental procedures ○ Acquisition of technical skills of micropropagation and of “in vitro” culture of plant tissues 		
Soft skills	<ul style="list-style-type: none"> ● <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> ○ Autonomy in the use and application of experimental protocols on plant matrices ○ Ability to know how to choose and apply the most appropriate methodology in plant studies ● <i>Communicating knowledge and understanding</i> ● Acquisition of a lexicon and appropriate terminology related to the specific plant discipline ● <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ Acquisition of skills in the organization of one's work in the laboratory and in the critical capacity of the results obtained ○ Consultation of bibliographic and site information will allow to be always updated about new knowledge and development of the discipline 		

Assessment and feedback	
Methods of assessment	<i>Oral exam</i>
Evaluation criteria	<ul style="list-style-type: none"> ● <i>Knowledge and understanding</i> <ul style="list-style-type: none"> ○ Acquisition of knowledge of plant biology necessary to understand experimental methods and protocols in the plant field ● <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> ○ Learning of the theoretical and practical contents performed throughout the course ● <i>Autonomy of judgment</i> <ul style="list-style-type: none"> ○ Autonomy in choosing the most appropriate methodological survey for a given plant problem ● <i>Communication skills</i> <ul style="list-style-type: none"> ○ The appropriate level of communication skills will be assessed during lectures, the experimental laboratory and the final oral exam ● <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ Acquisition of specialist terminology related to the specific plant discipline



Criteria for assessment and attribution of the final mark	<p><i>The exam includes three oral questions concerning lectures and practical laboratory activities. The evaluation expresses sufficiency with the vote of 18/30. The maximum vote is 30/30.</i></p> <p><i>POINTS:</i></p> <p><i>Null 1-6</i></p> <p><i>Seriously insufficient 7-12</i></p> <p><i>Insufficient 12-17</i></p> <p><i>Sufficient 18-21</i></p> <p><i>Good 22-24</i></p> <p><i>Very good 25-27</i></p> <p><i>Excellent 28-30</i></p> <p><i>The attribution of "30 cum laude" takes place in exceptional cases in which the student, having obtained the maximum possible evaluation within the pre-established parameters, presents further or extraordinary merits (e.g. clear and brilliant exposition, further details), emerged during the exam.</i></p>
Additional information	