



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>Genetic resistances to plant diseases (Module of Plant Breeding of agricultural crops)</b>
Degree course	Master Course in Plant Medicine (LM69)
Academic Year	Second
European Credit Transfer and Accumulation System (ECTS)	3
Language	Italian
Academic calendar (starting and ending date)	First semester (September 26, 2022 - January 20, 2023)
Attendance	NO

Professor/ Lecturer	
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Virtual headquarters	Codice Microsoft Teams: qrvrkal
Tutoring (time and day)	Monday to Friday 10:30 - 12:30 according to an established appointment requested by phone or e-mail..

Syllabus	
Learning Objectives	
Course prerequisites	Knowledge of plant pathology requests for admission to the Master Course in Plant Medicine
Contents	Refer on: disease, pathogens, pathogenesis, disease cycle and defence reactions of plants. Disease management strategies and plants resistance to pathogens. Resistance mutability in plants and variability of pathogens. Types and sources of resistance. Genetic basis of resistance. The gene-for-gene theory and the plant-pathogen co-evolution. Physiological races and resistance managing strategies. Factors affecting expression of resistance. Production of resistant varieties by breeding for resistance and bio-technological methods. Disease resistances of some important crops (wheat, barley and other cereals; tomato, potato, pepper and eggplant; melon, watermelon and cucumber; lettuce; peas; apple: plum; olive; cypress). Screening and selecting for resistance. Case studies of resistance breeding of greenhouse and field crops.
Books and bibliography	<ul style="list-style-type: none"> <li>• Notes on lectures distributed during the course.</li> <li>• Crinò P. et al., 1993. Miglioramento genetico delle piante per resistenza a patogeni e parassiti. Edagricole.</li> <li>• Crute E.B. et al., 1997. The gene-for-gene relationship in plant-parasite interactions. CAB International.</li> <li>• Slusarenko A.J. et al., 2001. Mechanisms of resistance to plant diseases. Kluwer Academic Publishers</li> <li>• Agrios G.N., fifth edition. Plant Pathology. Elsevier Academic Press .</li> </ul>
Additional materials	



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	
Teaching strategy			
<p><i>The topics of the course will be treated with:</i></p> <ul style="list-style-type: none"> <li>• Lectures presented through PowerPoint and other supports.</li> <li>• Classroom or laboratory exercises</li> <li>• Working groups</li> <li>• Lab, field and greenhouse training.</li> <li>• Case studies</li> <li>• Comparison with the experiences of stakeholders'</li> </ul> <p><i>Public platforms (e.g. Teams) and dedicated platforms (Agripodcast) will be used in E-learning mode, especially at the request of students with disabilities, working students, student athletes and students with new-borns.</i></p>			
Expected learning outcomes			
<b>Knowledge and understanding on:</b>		<ul style="list-style-type: none"> <li>○ Physiological and genetic basis of plant resistance to diseases;</li> <li>○ Method to acquire, transfer and manage resistances;</li> <li>○ Sources of resistances useful to constitute resistant varieties against the main agents of plant disease.</li> </ul>	
<b>Applying knowledge and understanding on:</b>		<ul style="list-style-type: none"> <li>○ Strength and weakness of control strategies based on use of resistant plant varieties</li> <li>○ Design and apply plant breeding programme for resistance to diseases.</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>○ The ability to assess in different environmental and crop conditions the usefulness of available resistant varieties for plant disease control</li> </ul> </li> <li>• <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ The ability to express clearly and synthetically the contents of the course by using the specific formal language</li> </ul> </li> <li>• <i>Capacities to continue learning</i> <ul style="list-style-type: none"> <li>○ The ability to use knowledge and understanding obtained from the course to continuously upgrade new knowledge concerning plant resistance to diseases.</li> </ul> </li> </ul> <p>The expected results of learning, in term of knowledge and skills, are listed in the Annex A of the Teaching Regulation of the Master Course in Plant Medicine (expressed by means of the European Descriptors of the Master Course; concerning the Plant Protection disciplines).</p>	
Assessment and feedback			
Methods of assessment		<p><i>The exam, unique, total and collegial for the I.C. Plant Breeding of agricultural crops, consists of an oral test on the topics developed during lectures, classroom or laboratory exercises, working groups, Lab, field and greenhouse training of both modules as reported in the Didactic regulation of the Master Course in Plant Medicine (article 9) and in the syllabus (Annex A).</i></p>	



	<p><i>The evaluation of the student's preparation is based on established criteria, as detailed in Annex A of the study regulations of the master's degree program. For students enrolled in the academic year in which the I.C. is taught, there is an intermediate exemption oral test. This exemption regarding the subjects of lectures and laboratory classes held in the period before the test itself (about half of the program of each module). The exemption test for Genetic resistances to plant diseases module consists at least of two oral questions about lectures and laboratory classes held in the period before the test itself. The positive results of exemption test of both modules contribute to the evaluation of the examination of I.C. and are valid for one academic year. Exemption test and final exam are expressed in thirtieths. For students fit to the exemption test, the final oral exam will point on topics of lectures and laboratory classes held in the subsequent period of the test itself. For Genetic resistances to plant diseases module at least of two oral questions will be given. For these students, the assessment of the exam is expressed as an average between exemption test and final exam. For students who have NOT passed/supported the exemption test, the exam for the physiopathology module consist at least of four questions. For foreign students the exam can be done in English.</i></p>
<p>Evaluation criteria</p>	<ul style="list-style-type: none"> <li>• <b>Knowledge and understanding</b> <ul style="list-style-type: none"> <li>○ Reach sufficient knowledge on genetic resistance to plant diseases</li> <li>○ Describe the variability of resistance in plants and the variability of pathogens</li> <li>○ Describe types and sources of resistance, the genetic basis of resistance</li> <li>○ Describe the influence of exogenous and endogenous factors on the expression of resistance</li> <li>○ Describe the methods associate to resistance transfer to new cultivars</li> <li>○ Describe examples of resistance in agricultural crops.</li> </ul> </li> <li>• <b>Applying knowledge and understanding</b> <ul style="list-style-type: none"> <li>○ Comment the programs for the exploitation of resistance to biotic stress</li> <li>○ Describe traditional and innovative techniques for the use of genetic resistance in disease management</li> </ul> </li> <li>• <b>Autonomy of judgment</b> <ul style="list-style-type: none"> <li>○ Express reasonable assumptions of programs for the exploitation of resistance to biotic stress</li> </ul> </li> <li>• <b>Communicating knowledge and understanding</b> <ul style="list-style-type: none"> <li>○ The students have to be able to explain topics acquired during classes.</li> </ul> </li> <li>• <b>Communication skills</b> <ul style="list-style-type: none"> <li>○ Describe with appropriate language the traditional and innovative techniques for the use of genetic resistance in the management of plant diseases</li> </ul> </li> <li>• <b>Capacities to continue learning</b> <ul style="list-style-type: none"> <li>○ The student is expected to show the achievement, according with previously reported expected learning, outcome, at least of the satisfactory knowledge levels, to start professional activity</li> </ul> </li> </ul>
<p>Criteria for assessment and attribution of the final mark</p>	<p><i>The verification of the learning outcomes related to the individual indicators will take place during the lessons, laboratories, ongoing tests and final exam. It is expected that the student correctly understands the question posed and provides in a synthetic way but with adequate arguments, the details necessary to</i></p>



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	<i>formulate the correct answer, also through links to similar topics covered in the teaching program. The evaluation of the ongoing test and the exam is expressed in thirtieths.</i>
<b>Additional information</b>	