

General Information	
Academic subject	<b>Physiological plant pathology (module of I.C. Plant physiology and physiopathology)</b>
Degree course	<b>Master course in Plant medicine (LM69)</b>
Curriculum	
ECTS credits	3
Compulsory attendance	No
Language	Italian

Subject teacher	Name Surname	Mail address	SSD
	<b>Giovanni L. BRUNO</b>	giovanniluigi.bruno@uniba.it	AGR 12

ECTS credits details			
Basic teaching activities	Plant Protection disciplines		

Class schedule	
Period	First semester
Year	First year
Type of class	Lectures, 2 ECTS (16 hours) Laboratory and field classroom, 1 ECTS (14 hours)

Time management	
Hours	75
In-class study hours	30 (16 Lectures + 14 Lab & field cl.)
Out-of-class study hours	45

Academic calendar	
Class begins	October 9, 2017
Class ends	January 26, 2018

Syllabus	
Prerequisites/requirements	Knowledge of Physiology and pathology requests for admission to the Master course.
Expected learning outcomes (according to Dublin Descriptors)	<p><i>Knowledge and understanding</i></p> <ul style="list-style-type: none"> <li>○ Knowledge of the main morphological, biochemical, physiological, cytological, and genetic alterations caused by pathogens in plants and methodologies for studying;</li> <li>○ Understanding of virulence factors and molecules-signal produced by plant-pathogens and their effects on physiological functions of plants;</li> <li>○ Knowledge of principal molecules synthesized by the plant as a response to the presence of pathogen;</li> <li>○ Knowledge about biomolecules produced by plant-pathogenic fungi and bacterial used in agriculture.</li> </ul> <p><i>Applying knowledge and understanding</i></p> <ul style="list-style-type: none"> <li>○ Capacity to identify the type of stress which a plant is subjected and the mechanisms associated with it;</li> <li>○ Capacity to associate pathogen-virulence-factors and plant-defense-molecules at the different stages of the infection process;</li> <li>○ Knowledge about biomolecules applied as chemicals.</li> </ul> <p><i>Making informed judgements and choices</i></p> <ul style="list-style-type: none"> <li>○ Ability to analyze plant-pathogen interaction as physiological decayed pathway.</li> </ul> <p><i>Communicating knowledge and understanding</i></p>

	<ul style="list-style-type: none"> <li>○ Ability to discuss critically the physiopathological bases of plant-pathogen interaction-environment-resident organisms.</li> </ul> <p><i>Capacities to continue learning</i></p> <p>The expected results of learning, in term of knowledge and skills, are listed in the Annex A of the Teaching Regulations of the Master Course in Plant Medicine (expressed by means of the European Descriptors) and are summarized as ability to:</p> <ul style="list-style-type: none"> <li>• recognize the physiological basis of plant-pathogen interaction;</li> <li>• suggest the virulence factors used by plant-pathogens and the defenses carried out by the infected plant.</li> </ul>
Contents	<p>Refer on: disease, pathogenesis and disease cycle.</p> <p>Cytological, morphological, biochemical, physiological and genetic alterations, caused by pathogens in plants and methodologies of study.</p> <p>Pathogen virulence factors (enzymes, microbial toxins, exopolysaccharides, growth regulator substances, plasmids, suppressors of plant defense response).</p> <p>Signal-molecules produced by the pathogen before, during and after plant-pathogen-interaction. Production, perception and transduction of biochemical signals in plant defense. Activation of metabolic cycles involved in the resistance. Phenolic metabolism, phytoalexins. Induction of chemical defenses.</p> <p>Plant-pathogen-environment-interactions in order to prevent or contrast diseases development;</p> <p>Biomolecules produced by plant-pathogenic bacteria or fungi useful as chemicals.</p>
<b>Course program</b>	
Bibliography	<ul style="list-style-type: none"> <li>• Notes on lectures distributed during the course.</li> <li>• Matta A., Pennazio S., 1984 - Elementi di fisiopatologia vegetale, Pitagora.</li> <li>• Stacey G., Mullin B., Gresshoff P.M. (Eds.), 1997 - Biology of plant-microbe interactions. International Society for molecular plant-microbe interactions, APS.</li> <li>• Keen N. T., Mayama S., Leach J.E., Tsuyumu S. (Eds.), 2001 - Delivery and perception of pathogen signals in plants. APS.</li> <li>• Prell H.H., Day P.R., 2000 - Plant-Fungal pathogen Interaction: A classical and molecular view. Springer-Verlag</li> <li>• Buchanan B.B., Gruissem W., Jones R.L., 2003 - Biochemistry and Molecular Biology of Plants (cap. 20-21-24), ASPP.</li> </ul>
Notes	The texts are available in the library of plant pathology section of the Di.S.S.P.A. Department, and at the Lecturer office.
Teaching methods	Lectures will be presented by PowerPoint presentations and laboratory experiments.
Assessment methods	<p>The exam, unique, total and collegial for the Plant Physiology and Physiopathology I.C., consists of an oral test on the subjects of both modules "Plant physiology" and "Physiological Plant pathology" as reported in the Didactic regulation of the Master in "Plant medicine" (article 9) and in the syllabus (Annex A).</p> <p>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 IC 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 Plant Physiology and Physiopathology I.C., consists of an oral test on the subjects of both modules ("Plant physiology" and "Physiological Plant</p>

	<p>pathology"). 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.</p> <p>Exemption test and final exam are expressed in thirtieths.</p> <p>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 these students, the assessment of the exam is expressed as an average between exemption test and final exam.</p> <p>For foreign students the exam can be done in English.</p>
<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>	<ul style="list-style-type: none"> <li>• <i>Knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ Describe the main alterations caused by pathogens in diseased-plants and the appropriate methodologies of study;</li> <li>○ Describe the plant-pathogen-environment interactions in terms of virulence factors, molecules-signal, biochemical signals and their physiopathological aspects and applications in agriculture.</li> </ul> </li> <li>• <i>Knowledge and understanding applied</i> <ul style="list-style-type: none"> <li>○ Describe the plant-pathogen-environment interactions from a phyto-pathological point of view.</li> </ul> </li> <li>• <i>Autonomy of judgement</i> <ul style="list-style-type: none"> <li>○ Express reasonable assumptions on Plant-pathogen-environment interaction in terms of changed physiological functions.</li> </ul> </li> <li>• <i>Communication skills</i> <ul style="list-style-type: none"> <li>○ Describe with appropriate language the physiopathology of plant-pathogen-environment interaction.</li> </ul> </li> <li>• <i>Ability to learn</i> <ul style="list-style-type: none"> <li>○ Learning of knowledge of this module occurs during lectures and laboratory classroom, oral exemption test and final oral exam, testing and self-assessment-individual test learning available on ATutor platform of asynchronous teaching.</li> <li>○ A useful parameter is the time-lapse between the course frequency and the exam.</li> </ul> </li> </ul>
<p>Further information</p>	<p><b>Visiting hours</b>  Monday to Thursday morning or afternoon previous agreement by e-mail.</p>