General Information	
Academic subject	**Applied Plant Pathology**
Master's Degree course	**Plant Medicine (LM69)**
Curriculum	
ECTS credits	6
Compulsory attendance	No
Language	Italian (English will be used when required for foreign students into didactic material)

Subject teacher	Name Surname	Mail address	SSD
	Antonio Ippolito	antonio.ippolito@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 4 ECTS (32 hours) Laboratory, field classroom and field and packinghouse visits, working groups, study case, and transferring of stakeholders' experiences 2 ECTS (28 hours). E-learning using public (eg Teams) and dedicated (Agripodcast) platforms can be used, on demand as learning facilities for students with disabilities and for working students, student athletes and students with babies.

Time management	
Hours	**150**
In-class study hours	60 (32 Lectures + 28 Lab & field cl.)
Out-of-class study hours	**90**

Academic calendar	
Class begins	**September 28, 2020**
Class ends	**January 22, 2021**

Syllabus	
Prerequisites/requirements	
Expected learning outcomes	• *Knowledge and understanding skills* ○ Knowledge on etiology, epidemiology (sources of inoculation, survival, diffusion, favourable environmental conditions, etc.), symptomatology and damage of the most important biotic and abiotic diseases of the cultivated plants. Understand mechanisms, predisposing factors, and evolution in order to predict the loss of most important biotic and abiotic diseases of cultivated plants. • *Knowledge and understanding applied skills* ○ Ability to recognize the etiologic agents and the symptomatology, to understand the epidemiology and the

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	harmfulness of the most important biotic and abiotic diseases of cultivated plants with the ultimate aim of limiting the damage. • *Autonomy of judgment* o Ability to acquire information on symptomatology, environmental conditions, predisposing factors etc. in order to identify the causal agents of biotic and abiotic plant and product diseases. • *Communicative Skills* o Ability to describe in oral and written form various aspects characterizing biotic and abiotic diseases that reduce the quality of cultivated plants and products. • *Ability to learn* o Ability to deepen and update the knowledge on the causal agents of main biotic and abiotic diseases of plants and products The expected learning outcomes in terms of knowledge and abilities are listed in Annex A of the Didactic Regulation of the course Plant Medicine (expressed by European Descriptors)
Contents	Introduction to the course: program that will be delivered; short recalls of general plant pathology. Parasitic higher plants. **Abiotic diseases** Lack and excess of light; damage from high temperatures, cold damage; daily energy balance; inversion layer; factors influencing the development of frost; frost damages; defense against frost. Nutrient deficiency and toxicity (general aspects; deficiencies and excess of nitrogen, phosphorus, potassium, calcium, iron, zinc, magnesium, and manganese), blossom-end rot of tomato and stem necrosis of grapes. Damage from excessive salt in soil and irrigation water. **Biotic Diseases** Pseudomonas syringae pv. tomato; Xanthomonas campestris pv. vesicatoria; Clavibacter michiganensis subsp. michiganensis; Pseudomonas corrugata; Xanthomonas campestris pv. campestris; Pectobacterium atrosepticum; Pectobacterium carotovorum subsp. carotovorum; Pectobacterium chrysanthemi; Streptomyces scabies. Ralstonia solanacearum; Clavibacter michiganensis subsp. sepedonicus. Agrobacterium tumefaciens. Pseudomonas syringae pv. actinidiae. Plasmodiofora brassicae; Peronosporacee general aspects; Pythium and Phytophthora general characteristics; Pythium debarianum and Pythium ultimum. Phytophthora diseases: Phytophthora infestans, P. nicotianae; downy mildew of lettuce, cucurbits, cruciferous, onion, spinach; gangrenous foot of pepper. Major viral diseases of vegetables. Grape diseases: downy mildew, powdery mildew, escoriosis, esca disease, gray mold and other rots in pre and post-harvest; Agrobacterium vitis; main viral diseases.

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	Diseases of Citrus: Pseudomonas syringae pv. syringae and Xanthomonas axonopodis pv. citri; root rot, gummosis, damping-off of seedlings and brown rot of citrus; tristeza; blue green mold; mal secco; dry root rot; main viral diseases. Diseases of stone fruit and pome fruit: Rosellinia and Armillaria root rot; moniliosis; leaf curl of peach; Chondrostereum purpureum; Corineus; root rot, bacterial cancer, Pseudomonas syringae pv. syringae; Erwinia amylovora; sharka;. Blue mould of apple fruits; Apple and pear scab. Olive diseases: Verticillium; cercosporiosis; peacock eye; olive knot; Xylella fastidiosa. Diseases of wheat: cereal rusts and loose smuts; powdery mildew; Septoria tritici blotch; Common root rot; Eyespot; Fusarium root, crown, and foot rots; Take-all.
Course program	
Bibliography	• Lecturer's note of the course and other teaching material (monographs, PDF files, etc.) distributed throughout the course. • Fondamenti di patologia vegetale (A. Matta, R. Buonaurio, A. Scala) seconda edizione 2017, Patron • Elementi di Patologia vegetale (G. Belli) seconda edizione, 2012, Piccin Nuova libraria • Phytobacteriology: Principles and Pratice (J. D. Janse) • Nutrient deficiency and toxicity in crop plants (W.F. Bennet ed) 1993 APS Press. • Elementi di virologia vegetale (Giunchedi L., Gallitelli D., Conti M., Martelli G.P.), 2007 -. Piccin Editore. • "Patologia Postraccolta dei Prodotti Vegetali" – V. De Cicco, P. Bertolini, M.G. Salerno (Ed.) Piccin Editore, Bologna 2009. • Difesa sostenibile delle Colture (P. Battilani) 2016, Edagricole.
Notes	
Teaching methods	The course will be dealt with PowerPoint presentations, video clips, mailing lists, edmode, teams, dropbox, on-line consultations of internet sites during lessons and/or practicum, case-study on samples of infected material, classroom and/or laboratory practicum, visits to farms and packinghouses.
Assessment methods	For students enrolled in the year in which the lesson is held, an exemption test is foreseen. The test consists of a written exam on the topics developed during the theoretical and practical lessons in the classroom and at the laboratory until the date of the exam. The exam will be evaluated in thirty and in the event of a positive result, the next oral test will focus on the topics developed during the theoretical and practical lessons in the classroom and in the laboratory following the date of the exam. The outcome of this test is the evaluation of the profit test and is valid for one academic year. The exam consists of an oral test on the topics developed during the theoretical and practical lessons in the classroom and in the laboratory as reported in the Didactic Regulations of the Master Degree Course in Food Science and Technology (art.9) and in the Study (Annex A).

	A minimum of 4 questions will be proposed to the student regarding the following topics: abiotic diseases, bacterial diseases, fungal diseases and viral diseases. The assessment of the student's preparation takes place on the established criteria, as detailed in Annex A of the Teaching Regulations of the Degree Course. The foreign student's profit test can be done in English in the manner described above.
Evaluation criteria	• *Knowledge and understanding skills* ○ Describe the etiology, epidemiology, symptomatology, and damage of the most important biotic and abiotic diseases of cultivated plants presented during the lessons; Demonstrate understanding of the mechanisms, predisposing factors and evolution of biotic and abiotic diseases of cultivated plants for an adequate prognosis. • *Knowledge and understanding skills applied* ○ Describe the causal agents, epidemiology, symptomatology and the damage of the most important biotic and abiotic diseases of the cultivated plants, demonstrating their mastery of exploiting that knowledge to the ultimate aim of limiting disease harmfulness. • *Autonomy of judgment* ○ Provide reasonable hypotheses for the classification of diseases presented as case studies. • *Communicative Skills* ○ Describe in detail and with appropriate language the various aspects of biotic and abiotic diseases that affect cultivated plants or presented as case studies. • *Ability to learn* ○ Describe in depth and up-to-date the elements characterizing the most important biotic and abiotic diseases of cultivated plants.
Further information	**Consulting hours** In the morning or afternoon previous appointment by e-mail or telephone. Tutoring could be also on e-learning platforms.

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