General information	
Academic subject	**Applied Plant Pathology**
Degree course	*Plant Medicine (LM69)*
Academic Year	*1*
European Credit Transfer and Accumulation System (ECTS)	6
Language	*Italian (English will be used on demand to foreign students)*
Academic calendar (starting and ending date)	*First semester (from 2021 September 27 to 2022 January 21)*
Attendance	*No*

Professor/ Lecturer	
Name and Surname	**Antonio Ippolito**
E-mail	antonio.ippolito@uniba.it
Telephone	0805443053
Department and address	Dipartimento di Scienze del Suolo della Pianta e degli Alimenti, Plant Pathology Unit, third floor south staircase, via Amendola 165/A, Bari
Virtual headquarters	Microsoft Teams code: ddel7ce
Tutoring (time and day)	From Monday to Friday by appointment through e-mail or by telephone. Tutoring can also be carried out electronically.

Syllabus	
Learning Objectives	The course aims to provide in-depth knowledge about: - abiotic diseases in their etiological and control aspects, with particular reference to extreme environmental conditions, and nutritional diseases. - biotic diseases caused by bacteria, fungal-like and fungal agents, as well as viruses, with insights into their biology and epidemiology.
Course prerequisites	Knowledge of plant biology and general plant pathology
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.

	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.
Books and bibliography	• Lecturer's note of the course and other teaching material (monographs, PDF files, etc.) distributed throughout the course. • Patologia vegetale (G. Vannacci et al.), 2021, Edises Università • Difesa sostenibile delle Colture (P. Battilani) 2016, Edagricole.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.
Additional materials	

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
150	32	28	90
ECTS			
6	4	2	

Teaching strategy	The course will be dealt with PowerPoint presentations, video clips, mailing lists, 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. All the material used for the lessons will be made available to students on specific web platforms (eg Microsoft Teams). For students with disabilities, working students, students with infants and athletes, the procedures codified by the University will be adopted.
Expected learning outcomes	
Knowledge and understanding on:	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.
Applying knowledge and understanding on:	Ability to recognize the etiologic agents and the symptomatology, to understand the epidemiology and the harmfulness of the most important biotic and abiotic diseases of cultivated plants with the ultimate aim of limiting the damage.
Soft skills	• *Making informed judgments and choices* Ability to acquire information in order to identify the etiological agents, environmental conditions enhancing diseases, etc to better frame the harmfulness of biotic and abiotic plant diseases. • *Communicating knowledge and understanding* Ability to describe in oral and written form the various aspects that characterize the biotic and abiotic diseases affecting cultivated plants. • *Capacities to continue learning* Ability to deepen and update knowledge oN the etiological agents, epidemiology, symptoms and harmfulness of the most important biotic and abiotic diseases of cultivated plants.

Assessment and feedback	
Methods of assessment	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 basis of 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* 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. • *Applying knowledge and understanding* 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. • *Communicating knowledge and understanding* Describe in detail and with appropriate language the various aspects of biotic and abiotic diseases that affect cultivated plants or presented as case studies. • *Communication skills* Provide a description of biotic and abiotic diseases of plants by using a simple but appropriate language easy to understand, with various examples from real cases. • *Capacities to continue learning* Describe in depth and up-to-date the elements characterizing the most important biotic and abiotic diseases of cultivated plants.
Criteria for assessment and attribution of the final mark	The assessment of the learning outcomes concerning single indicators will take place during the lessons, exercises, ongoing tests and during the oral interview for the final exam. The student must correctly understand the question posed and provide the correct answer in a concise manner and adequate arguments, also ranging from similar topics covered in the teaching program. The evaluation of the exemption test and the exam is expressed in thirtieths. The assessment of the student's preparation takes place on the basis of pre-established criteria, as detailed in Annex A of the Teaching Regulations of the Master's Degree Course.
Additional information	