General information	
Academic subject	**Biological and Integrated Protection from the diseases (module of I.C. Plant Protection)**
Degree course	**Master's degree Plant Medicine (LM69)**
Academic Year	2022-2023 (Second year, first semester)
European Credit Transfer and Accumulation System (ECTS)	6
Language	Italian
Academic calendar (starting and ending date)	September 26th 2022-Junuary 20th 2022 (Pause 2022 November 14th – 25th, for midterm exam)
Attendance	No mandatory

Professor/ Lecturer	
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Department and address	Department of Soil, Plant and Food Sciences - first plexus, Plant Pathology Section, Third floor room n. 11
Virtual headquarters	
Tutoring (time and day)	From Monday to Friday, 9.00 a.m. to 1.30 p.m., following an established appointment requested by phone, e-mail or Teams.

Syllabus	
Learning Objectives	**Plant Protection disciplines** The course, part of the IC -Crop Protection, intends to provide in-depth knowledge about: the legislation on plant protection products; the mechanisms of action of the main plant protection products used in agriculture and their metabolism in plants; the correct use of plant protection products to protect the environment, operators and consumers; integrated and biological protection strategies against the main diseases of Mediterranean crops and products also to limit contamination by mycotoxins.
Course prerequisites	Knowledge of Plant Pathology requests for admission to the Master course.
Contents	Presentation of the course and educational aims. Historical evolution of crop protection. Legislative, agronomic, physical and genetical tools. Normative on the commercialization and usage of plant protection products and microbial antagonists. Crop protection: environmental sustainability and food safety. Functional classification of fungicides and their modes of action. Resistance of fungi to fungicides: genetic and biochemical bases, methods for detection, prevention and management. Biological control. Inducers of resistance (SAR). Crop protection in organic agriculture. Integrate Pest Management (IPM) guidelines. Certification of quality and crop protection. Decision Supporting Systems: forecasting models, expert systems, and warning systems. Study cases: integrated protection from diseases of grapevine, stone fruits, olive,

	citrus and protected crops.
Books and bibliography	• Personal notes of the lectures and didactic materials distributed during the course. • Lorenzini G., Nali C., 2012. Principi di Fitoiatria, Edagricole-New Business Media, Bologna, pp. 261. • Battilani P., 2016. Difesa sostenibile delle colture. Principi, sistemi e tecnologie applicate alle Produzioni agricole. Edagricole-New Business Media, Bologna, pp. 308.
Additional materials	Additional readings • I.For.P.M.I. Promteo Puglia. Manuale sull'uso sostenibile dei prodotti fitosanitari, Editrice Rotas barletta, pp. 271. • Butturini A., Galassi T., 2014. Difesa fitosanitaria in produzione integrata. Manuale dei metodi e delle tecniche a basso impatto. Edagricole-New Business Media, Bologna, pp. 397. • Atti Giornate Fitopatologiche, 2014-2022. Further materials will be provided on request by the teacher.

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	Oral presentation supported by Power Point slides, web sites and multimedia, by the usage of blackboard, documents prepared by the teacher and practical exercises in the classroom and in the laboratory.
Expected learning outcomes	
Knowledge and understanding on:	○ Knowledge and understanding of principles, methods and tools for plant protection from diseases. ○ Knowledge and understanding of the European and National regulations on plant protection products. ○ Knowledge and understanding of classification of fungicides, their modes of action and resistance.
Applying knowledge and understanding on:	○ Knowledge and understanding of the sustainable usage of pesticides. ○ Knowledge and understanding for a rational approach to planning crop protection strategies. ○ Knowledge and understanding of the phenomenon of acquired fungicide resistance.
Soft skills	*Making informed judgements and choices* ○ Ability to understand how disease epidemiology influences crop protection strategies. ○ Ability to understand how to prevent and/or manage fungicide resistance. ○ Ability to plane crop protection strategies aimed at ensuring yield, quality safety and security and at minimizing the environmental impact and risks for human health. *Communicating knowledge and understanding*

	○ Ability of describing suitable biological and integrated protection strategies for the most important Mediterranean crops. ○ Ability of evaluating the benefits, risks and negative side effects of crop protection strategies. ○ Ability of evaluating the sustainability of crop protection strategies. *Capacities to continue learning* ○ Capacities of updating the knowledge on crop protection and related regulation. The results of the expected learning, in term of knowledge and ability, are listed in the Annex A of the Didactic Regulation of the Bachelor Course (expressed by the European descriptors of the study title).

Assessment and feedback	
Methods of assessment	Only the students enrolled in the academic year during which this discipline is offered, can have an intermediary exam during the teaching period of the discipline. The result of this intermediary exam remains valid for the whole academic year and concurs to the final evaluation of the student. The intermediary exam will be given on the subjects treated during the lessons and the practical activities as reported in the Didactic Regulation of the Bachelor course (art. 9) and syllabus (annex A) and which is correlated to the actual teaching period. At the end of the module teaching period, the students, who passed positively the intermediary exam, can give the final exam concerning on the subjects treated during the lessons and the practical activities since the intermediary exam, as reported in the Didactic Regulation of the Bachelor Course (art. 9) and syllabus (annex A) and which is correlated to the actual teaching period. Students who did not pass or give the intermediary exam will be examined on the whole subjects treated during the lessons and the practical activities as reported in the Didactic Regulation of the Bachelor course (art. 9) and syllabus (annex A) and which is correlated to the actual teaching period. The intermediary and the final exams consist of an oral test. The exam for foreign students can be given in English according to the above reported modalities.
Evaluation criteria	• *Knowledge and comprehension ability* ○ Ability to describe the principles, methods and tools for plant protection from diseases. ○ Ability to describe the European and National regulations on plant protection products. ○ Ability to describe the fungicides and their modes of action and resistance. ○ Ability to describe the phenomenon of acquired fungicide resistance. • *Knowledge and applied comprehension ability* ○ Ability to define appropriate protection strategies for Mediterranean crops. ○ Ability to define suitable strategies for preventing or managing fungicide resistance. • *Autonomy of judgement* ○ Ability to describe benefits, risks and negative side effects of crop protection strategies. ○ Ability to adapt general roles to specific crops and situations. • *Communication skills* ○ Ability to explain in exhaustive way, with appropriate words, richness of conceptual connections and examples, the principles, methods and tools for crop protection, the Regulations on plant protection products,

	fungicides and their mode of action, fungicide resistance, sustainable protection strategies for Mediterranean crops. ○ Ability to organize the acquired knowledge in form of didactic presentation and to articulate it for didactic purposes • *Learning ability* ○ Ability to apply acquired knowledge and skills for problem solving in various operative situations.
Criteria for assessment and attribution of the final mark	The evaluation of the exam is expressed in thirtieths. The final mark will consider the theoretical and practical knowledge acquired, the ability to apply the knowledge, autonomy of judgment, communication skills and on the ability to integrate the acquired knowledge in a project work. The evaluation of the student is based on criteria previously fixed such as reported in the Annex A of the Didactic Regulation of the Master Course in Plant Medicine.
Additional information	

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