Sustainable and Precision Crop Defence

ENTOMOLOGY MODULE

Prof. Emanuele Mazzoni

COURSE AIMS AND INTENDED LEARNING OUTCOMES

The course aims to provide students with the knowledge and experience necessary to manage sustainable and precision crop defence in integrated production and organic farming.

At the end of the course, students will be able to know the phytosanitary problems of the main agricultural crops and will have acquired sufficient knowledge and experience to understand and critically address new phytosanitary problems deriving from changed agronomic, ecological and/or weather-climatic conditions. Students will also be able to collect and independently manage the data needed to support decisions, or integrate any deficiencies based on previous experiential data or on a completely autonomous study of scientific literature and on the development of investigations/experiments/research to complete knowledge gaps. They will also be able to communicate what they have learned in a clear, comprehensive and unambiguous way to their interlocutors, both specialists and not.

COURSE CONTENT

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|  | ECTS |
| The general criteria for precision defence in integrated and organic production. Evolution of defence strategies. Selectivity of plant protection products.  | 0.5 |
| Non-hexapod organisms harmful to crops (Nematodes, Molluscs, Mites). | 1.0 |
| Biological combat and natural antagonists of the species harmful to crops. | 1.0 |
| Use of low impact techniques: pheromones and pathogens. Agronomic techniques and ecological infrastructures. | 1.5 |
| Systems and techniques for the justification of defence interventions. Prevention and monitoring of resistance to plant protection products. | 0.5 |
| Integrated production specifications. Issues, strategies and application examples of integrated and organic defence to:- fruit trees (pomaceous, drupaceous) and vines; - horticultural and protected crops;- cereals (corn and wheat). | 0.5 |
| Tutorials. Technical visits to organisations and production facilities involved in the application of integrated/organic defence. | 1.0 |

READING LIST

Preferred texts

P. Battilani (Ed.), *Difesa sostenibile delle colture*, Edagricole, Milan, 2016

Recommended texts

A. Butturini, T. Galassi, Difesa fitosanitaria in produzione integrata, Edagricole, Milan, 2014

TEACHING METHOD

* Theoretical frontal lectures and dialogues to present and discuss the topics and key concepts of the discipline, with the support of PowerPoint presentations that, together with other teaching material, will be made available to students enrolled in the course through the blackboard platform at the end of the corresponding lessons.
* Seminars with experts for in-depth analyses of particularly topical issues.
* Students will participate in technical visits to companies and organisations involved in the application of integrated crop defence. The examples and concepts covered during the visits will be discussed during the examination.

ASSESSMENT METHOD AND CRITERIA

A final oral exam, which will have a minimum duration of 20 minutes and will be marked out of thirty. The oral exam will assess the student's ability to develop and apply integrated and biological combat strategies within the context of the regulations in force, their ability to understand the questions and answer them in an appropriate and pertinent way, their ability to organise their answers in a clear and detailed manner, demonstrating their command and mastery of the scientific language and terminology, the accuracy and level of their knowledge on the subject, and their ability to process the acquired knowledge independently and in an original way.

NOTES AND PREREQUISITES

Students are invited to register for the course on the Blackboard platform and to visit it regularly for any alerts or updates.

Students are required to have knowledge of agricultural entomology and a basic knowledge of crop protection.

Should the health situation relating to the Covid-19 pandemic not allow face-to-face teaching, remote teaching in synchronous or asynchronous mode will be guaranteed; this will be communicated in good time to students.

Information on office hours available on the teacher's personal page at http://docenti.unicatt.it/.

Module on Module

Prof. Vittorio Rossi

COURSE AIMS AND INTENDED LEARNING OUTCOMES

The course aims to provide students with the knowledge and skills necessary to manage disease control in sustainable agriculture and organic agriculture.

At the end of the course, students will be able to: analyse agricultural crops as complex ecosystems, in which different components interact dynamically; consider harmful organisms as one of these components and understand the relationships between pathogens and other components (for example, weather conditions, soil, plants, other microorganisms); and critically exploit this knowledge to develop strategies and tactics for the sustainable protection of agricultural crops, including the use of precision techniques. Students will be able to: plan and conduct monitoring activities in the vineyards with traditional and innovative methods; autonomously manage the information and data necessary to support decision-making processes for crop protection, including with the help of innovative tools (for example: mathematical models, web-based decision support systems); and, finally, analyse the results to highlight errors or knowledge gaps.

Students will develop the ability to independently process and critically analyse available knowledge using a multidisciplinary approach, so as to be able to face and solve new and/or unexpected problems. Students will also be able to communicate what they have learned in a clear, comprehensive and unequivocal way to their interlocutors.

COURSE CONTENT

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| Topics | ECTS |
| Introduction to sustainable crop protection: general concepts; principles of integrated pest management; Directive 128/2009/EC; general structure of IPM (Integrated Pest Management). | 1 |
| IPM methods: new tools and methods for IPM, including resistant varieties, pathogen prevention and suppression methods, crop monitoring and scouting, modelling and other decision-making tools; biocontrol agents and other non-chemical methods for disease control; characteristics of plant protection products; anti-resistance strategies; distribution of pesticides; precision crop protection. | 3 |
| Organisation of IPM: the current situation of IPM in Italy; tools for supporting the decisions made regarding sustainable crop protection; strengths and weaknesses of the different tools; case studies. | 1 |
| Tutorials  | 1 |

READING LIST

Reading material will be indicated during the course.

TEACHING METHOD

* Frontal lectures in the classroom with the help of PowerPoint presentations and videos, and with time dedicated to questions and requests for clarification and/or further detail.
* Classroom tutorials using computerised support systems for decisions regarding IPM.
* Seminars with experts to study specific topics of particular relevance.
* Technical visits to regional facilities for technical assistance and companies involved in integrated or organic production.

ASSESSMENT METHOD AND CRITERIA

The final exam consists of a written test with 31 questions to be addressed in a maximum of 60 minutes. The questions may require, for example, single or multiple answers, the identification of correct options in a list, or their ordering according to relative importance; open-ended answers will also be included. The commission will assign a mark of zero or one to each of the written answers provided by the student. If all answers receive a mark of one, the final mark is 30 with distinction.

NOTES AND PREREQUISITES

Students must possess knowledge of general and special plant pathology.

The teaching material and any further in-depth analysis of topics will be available on the Blackboard platform.

Should the health situation relating to the Covid-19 pandemic not allow face-to-face teaching, remote teaching in synchronous or asynchronous mode will be guaranteed; this will be communicated in good time to students.

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