. - Plant Pathology Part A and B

Prof. Paola Battilani

Prof. Vittorio Rossi

***COURSE AIMS*** ***AND INTENDED LEARNING OUTCOMES***

The course aims to provide students with the necessary knowledge to deal with problems related to agricultural crop diseases, from diagnosis to the preparation of defence strategies. The intended learning outcomes are detailed below.

Knowledge and ability to understand

At the end of the course, students will know and understand:

1. Causative agents in plant diseases, and the management of pests in different agricultural systems in accordance with the European legislation in force.

2. Phytosanitary problems in crops of particular interest.

Understanding and applying knowledge

At the end of the course, students will be able to:

1. Apply their acquired knowledge to plant health and its implications in agricultural production.

2. Understand the cause of plant diseases and suggest possible actions for mitigating their effects on plant health and production.

Autonomous judging skills.

At the end of the course, students will be able to:

1. Evaluate the impact of major diseases on plant products, and suggest the most appropriate defence strategies for the phytopathological problems encountered.

Communication skills

At the end of the course, students will be able to:

1. Appropriately use the scientific language and specific lexicon of plant pathology to describe and communicate the concepts learnt in oral and written form.

Learning ability

At the end of the course, students will be able to:

1. Extend their knowledge of plant diseases beyond the topics discussed in lectures, through independent consultation of specialised texts, and scientific and educational journals.

COURSE CONTENT

|  |  |
| --- | --- |
| Part A (Prof. Battilani) | ECTS |
| The infectious process |  |
| Concept of disease, classification of diseases; parasite-host-environment relationships. Infection cycle (inoculation, penetration, incubation, evasion and dissemination), disease cycle (monocyclic and polycyclic diseases), conservation and sources of inoculum, means of spreading the inoculum. | 2.0 |
| Disease control |  |
| Parasite-related interventions: extinguishing, preventive, curative and eradicating interventions; legislative, physical, biological and chemical means. Host-related interventions: genetic improvement. Environmental interventions. Integrated defence of crops and organic farming. | 1.0 |
| Disease agents |  |
| Laboratory classes. | 1.0 |
| Diagnostic methods |  |
| Laboratory classes. | 1.0 |

|  |  |
| --- | --- |
| Part B (Prof. Rossi) | ECTS |
| Introduction to Plant Pathology and Disease Agents |  |
| Main characteristics of infectious agents (protozoa, chromists, fungi, bacteria, phytoplasma, viruses, viroids); symptomatology and diagnosis. | 1.0 |
| Host, pathogen and environment |  |
| Susceptibility, tolerance and resistance. Influence of climatic, edaphic and agronomic factors on the parasite-host relationship. | 0.5 |
| Special pathology and disease control |  |
| Principal diseases of vines, apples, tomatoes and cereals. | 1.5 |

READING LIST

G. Vannacci, *Patologia Vegetale,* EdiSES Università, 2021.

A. Matta-R. Buonaurio-F. Favaron-A. Scala-F. Scala, *Fondamenti di Patologia Vegetale,* Patron, 2017.

L. Giunchedi-M. Conti-D. Gallitelli-G.P. Martelli, *Elementi di virologia vegetale*, Piccin, Padua, 2007.

M. Scortichini, *Malattie batteriche delle colture agrarie,* Edagricole, Bologna, 1995.

The PowerPoint presentations used during the course will be made available to students in pdf format on the Blackboard platform.

For more in-depth information:

GN Agrios, *Plant pathology,* 5th ed., Academic Press, San Diego, California, 2005.

C. Zadoks-RD Schein, *Epidemiology and plant disease management,* Oxford University Press, New York, Oxford, 1979.

TEACHING METHOD

Frontal lectures will be conducted with the support of PowerPoint presentations.

The course will be supplemented with seminars, held by invited experts, on specific topics relevant to plant health.

Practical laboratory tutorials will be held for the application of diagnostic methods and the identification of biotic disease agents.

A *cooperative learning* experience will be organised on the use of podcasts (short videos) as a means of communication. Workgroups will be organised to carry out a *project* on topics related to plant pathology and of interest to students; the results of the work carried out will be presented collegially by the students in the form of a podcast.

ASSESSMENT METHOD AND CRITERIA

The summative (final) assessment will be a written assessment. The written test consists of three sections corresponding to the three blocks of programme topics:

1. Introduction to plant pathology; main characteristics of infectious agents; the infectious process: pathogenesis, inoculation, penetration, incubation; morphology, taxonomy and diagnosis of fungal pathogens (3 ECTS).
2. The infectious process: evasion, dissemination, conservation; epidemiology; mycotoxins; morphology, taxonomy and diagnosis of bacterial pathogens (2 ECTS).
3. Disease resistance; principles of crop defence; special pathology and disease management; morphology, taxonomy and diagnosis of viral pathogens (3 ECTS).

Each section of the test consists of 14 closed-ended questions (multiple-choice, yes/no, true/false) and 2 open-ended questions; the following marks are assigned for correct answers: 0.5 marks for closed questions; a maximum of 2 marks for open questions. For the multiple-choice closed-ended questions, each wrong answer carries a penalty of -0.25 marks. No mark is assigned to any question left unanswered. The maximum mark is 33/30 (11/30 for each part). The total duration of the written test is 90 minutes (30 minutes for each section). A mark of 6/10 for each section is required to pass the exam.

To facilitate students, 2 optional training assessments will be held during the course, which will cover the first and second sections of the programme. The tests aim to assess the students' level of learning and their ability to answer specific questions on the subject matter. Should a student pass the training assessment on the first and/or second part of the programme, their mark may, at their discretion, be used towards the summative assessment, provided that this takes place within one year of the training assessments. In this case, the summative assessment will be limited to those parts of the programme that have not yet been passed.

A training assessment will be conducted during the second half of the course; this will assess students' communication skills through the presentation and discussion of the podcasts prepared upon conclusion of their project work.

The assessment results will be made available to students through the Blackboard platform.

NOTES AND PREREQUISITES

Class attendance, although not compulsory, is strongly recommended.

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