# COURSE DETAILS

# "PRECISION CROP PROTECTION"

DEGREE PROGRAMME: PRECISION LIVESTOCK FARMING

ACADEMIC YEAR 2025-2026

## GENERAL INFORMATION – TEACHER REFERENCES

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## GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE:              PRECISION FEED PRODUCTION AND MANAGEMENT
MODULE:          PRECISION CROP PROTECTION
SSD OF THE MODULE:              AGRI05/B (EX AGR/12)
 CHANNEL:                       //
YEAR OF THE DEGREE PROGRAMME:   II
SEMESTER:                       II
CFU:                           5

**REQUIRED PRELIMINARY COURSES (IF MENTIONED IN THE COURSE STRUCTURE "ORDINAMENTO")**
**None**


**PREREQUISITES (IF APPLICABLE)**
**None**


## LEARNING GOALS

*The learning outcomes to be assessed include a comprehensive understanding of the course topics, including new technologies in precision crop protection, Integrated Pest Management (IPM), the application of biological control and beneficial microbes, and the sustainable use of pesticides.*

*Moreover, the course aims to provide students with specialist knowledge of precision nutrition. At the end of the course, the Feed Management module contributes to the achievement of the expected results through the learning of the following topics: metabolism and digestive utilisation of nutrients in monogastric and polygastric animals; evaluation of animal feed; use of precision tools to improve the evaluation of animal feed and the nutritional management of farm animals; development of balanced rationing plans.*


## EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

### Knowledge and understanding

*The course aims to provide students comprehensive understanding of the fundamental principles and applied concepts in plant pathology and crop protection. This includes the ability to critically analyze the **disease triangle** and the **disease cycle**, recognizing the complex interactions among host plants, phytopathogenic agents, and environmental factors.*

*Students are expected to acquire solid knowledge of the biology and classification of **phytopathogenic organisms** (fungi, bacteria, viruses, nematodes, etc.), along with current methodologies for **diagnosis** and **epidemiological assessment** of plant diseases. A thorough understanding of **plant resistance mechanisms** and how they can be integrated into management strategies is also essential.*

*Particular emphasis is placed on the **evaluation and application of new technologies in precision crop protection**, including digital tools for disease monitoring, remote sensing, and site-specific treatment systems. Students will critically assess these technologies in the context of **Integrated Pest Management (IPM)** strategies and explore the role of **biological control** and **beneficial microbes** in reducing dependency on chemical inputs.*

*Additionally, students will gain a solid understanding of the use, regulation, and impact of **pesticides**, as well as emerging concerns related to **mycotoxins** and the implementation of **sustainable control methods** to mitigate their occurrence.*

*By the end of the course, the student should be able to connect theoretical principles with practical applications, critically assess different approaches, and integrate sustainable and innovative solutions into real-world plant protection systems.*


### Applying knowledge and understanding

*The course delivers skills and methodological and operational tools for the student that is expected to demonstrate the ability to study and apply:*
*i) systems for monitoring crop diseases;*
*ii) plant protection products;*
*iii) disease control methods;*
*iv) treatments involving agrochemicals and biocontrol agents.*
*The student will be encouraged to develop specific skills to propose original and/or innovative solutions for plant protection within a sustainable agro-ecosystem. Furthermore, the student must demonstrate the ability to collaborate effectively in group work and present proposed solutions to the rest of the class. Moreover, the student should be able to clearly explain the knowledge acquired, express ideas and experimental approaches, and show competence in organizing, integrating, and applying the information assimilated during the course.*


## COURSE CONTENT/SYLLABUS

| FRONTAL LESSONS | h |
| --- | --- |
| • *Introduction* | 2 |
| • *Disease Triangle* | **2** |

| | |
|---|---|
| • *Disease Cycle* | 3 |
| • *Phytopathogen agents* | 3 |
| • *Diagnosis* | 3 |
| • *Epidemiology* | 2 |
| • *Plant Resistance* | 2 |
| • *New Technologies in Precision Crop Protection* | 4 |
| • *Integrated Pest Management (IPM)* | 2 |
| • *Biological Control and Beneficial Microbes* | 3 |
| • *Pesticides* | 2 |
| • *Mycotoxins - Sustainable control methods* | 2 |
| | |
| TOTAL | 30 |

| PRACTICAL TEACHING | h |
|---|---|
| Microbial isolation from infected plant tissue | 4 |
| Microbial characterization | 8 |
| Beneficial microbes: antibiotic activity | 8 |
| TOTAL | 20 |

## READINGS/BIBLIOGRAPHY

• *Lecture materials and resources provided during the course*

• *Selected scientific papers distributed throughout the course*

• *Agrios, G.N. Plant Pathology. Elsevier Academic Press, San Diego, California*

## TEACHING METHODS

*The course will be delivered through the following methods:*

*a) Lectures – covering 60% of the total course hours (frontal teaching)*

*b) Practical Activities – accounting for 40% of the total course hours, including:*

- *Practical exercises – 5% of total hours*
- *Laboratory sessions – 30% of total hours, aimed at deepening applied knowledge*
- *Seminars – 5% of total hours*

*The teacher will use a student-centered method; tutorials; practical lessons, learning by doing method. The lessons will be supported by multimedia teaching material available to students on the teacher's website, after registering for the course.*

## EXAMINATION/EVALUATION  CRITERIA

**a) Exam type:**

| Exam type | |
|---|---|
| **written and oral** | |
| **only written** | |
| **only oral** | X |
| **project discussion** | |
| **Other** | |

| **In case of a written exam, questions refer to: (\*)** | **Multiple choice answers** | |
|---|---|---|
| | **Open answers** | |
| | **Numerical exercises** | |

(\*) multiple options are possible

*Final exam at the end of the course*

**b) Evaluation pattern:**

*The oral exam consist of at least 4 questions (2 for each module) and the final mark will be obtained as a medium value between the module of Precision Crop Protection (AGR/12) and Feed management (AGR/18).*

*For the evaluation, the "Regulation for Guidelines_for_exams_management" approved by the Didactic Coordination Committee of the Master Degree in Precision Livestock Farming will be considered.*