Syllabus

Course Description

Course Title	Entomology and Phytopathology
Course Code	40225
Course Title Additional	
Scientific-Disciplinary Sector	NN
Language	English
Degree Course	Bachelor in Sustainable Agriculture and Forestry in Mountain Environments
Other Degree Courses (Loaned)	
Lecturers	Prof. Dr. Sanja Baric, Sanja.Baric@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/1049 Prof. Sergio Angeli, Sergio.Angeli@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/27643 dr. Lavinia Carlini, Lavinia.Carlini@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/44844
Teaching Assistant	
Semester	Second semester
Course Year/s	2
CP	10
Teaching Hours	60
Lab Hours	40
Individual Study Hours	150
Planned Office Hours	30
Contents Summary	The Entomology and Phytopathology course is a modular course. The Entomology module falls within the area of biological

	disciplines and is classified as a basic educational activity (attività formativa di base). The Phytopathology module, on the other hand, falls within the area of plant protection disciplines and is classified as a characterising educational activity (attività formativa caratterizzante). The main course contents are listed below: Module: Agricultural and Forest Entomology Fundamentals of entomology: structure, function, classification Insect identification Ecology and behavior of herbivores, predators, and parasitoids Examples of pest insects in crops, forestry and post-harvest Practical training in insect morphology, physiology, insect collection (insectarium), and chemical ecology Module Phytopathology: Concept of disease Environmental factors Parasitism and disease development: Viruses and viroids; Bacteria and mollicutes; Fungi and oomycetes; Parasitic plants; Plant-pathogenic nematodes Genetics of plant disease Mechanisms of pathogen attack and plant defence Epidemiology Diagnosis techniques
Course Topics	The module of Agricultural and Forest Entomology covers the following topics: 1. Reasons for the evolutionary success of insects; 2. Insect taxonomy and nomenclature; 3. Arthropoda; 4. Insect classification: Apterygota, Exopterygota, Endopterygota; 5. Insect orders and the most relevant families; 6. Insect morphology: head, thorax and abdomen; 7. Types of mouthparts: chewing, piercing-sucking, rasping-sucking, sponging, siphoning, etc.; 8. Types of antennae, wings and legs; 9. Male and female reproductive systems and types of ovipositors; 10. Insect life cycles, development and metamorphosis; 11. Insect integument and cuticle; 12. Feeding and digestion;

	13. Excretory, circulatory and respiratory systems; 14. Nervous system and sensory organs; 15. Insect chemical ecology: semiochemicals and pheromones; 16. Insect sampling and monitoring methods; 17. Insect natural enemies; 18. Introduction to Integrated Pest Management (IPM); 19. tIntroduction to the major insect pests affecting European agricultural and forest ecosystems. The module Phytopathology covers the following topics: Concept of disease in plants; types of plant diseases Impact of plant diseases Environmental factors that cause plant diseases Parasitism and disease development; stages in the development of disease: disease cycles Plant pathogenic viruses and viroids Plant pathogenic prokaryotes: bacteria and mollicutes Plant pathogenic fungi and fungal-like organisms: Zygomycetes; Ascomycetes; Basidiomycetes Plant pathogenic fungal-like organisms: Oomycetes Plant pathogenic nematodes and other parasitic organisms Genetics of plant disease: genetic variability; genetics of virulence in plant pathogens and resistance in host plants Mechanisms of pathogen attack and defense of plants against pathogens Epidemiology of plant diseases and population dynamics of pathogens Diagnosis techniques for plant pathogens
Keywords	Insects, Arthropods, Plant Pathogens; Plant Deseases, Integrated Pest Management (IPM), Organic Farming, Sustainable Pest Management, Agroecology
Recommended Prerequisites	
Propaedeutic Courses	No
Teaching Format	This is a lecture-lab course in which the main topics are presented by the Professor through PowerPoint presentations and interactive activities, including discussions and descriptive case studies. The practical sessions, laboratory activities, and didactic excursions are supervised by the Professor and the Teaching Assistants. During these activities, selected topics covered in the lectures are

	examined in greater depth through field observations and laboratory work. Students may also be asked to prepare and deliver short presentations to the class on selected topics. PowerPoint presentations and other course materials will generally be made available in the dedicated course channel on Microsoft Teams.
Mandatory Attendance	No
Specific Educational Objectives and Learning Outcomes	Knowledge and understanding The degree course provides advanced knowledge for the training of professionals capable of carrying out management and coordination activities in mountain and forestry agriculture, as well as effectively preparing students for possible further studies. All these skills will be transmitted to the graduates by means of face-to-face lecturing, technical and practical laboratory exercises, field exercises and educational-scientific excursions. The elaboration of the experimental thesis may be carried out both in the faculty's laboratories and in companies and local authorities. At the end of their studies, the three-year graduate at Sustainable agriculture and forest management in mountain environment possesses basic knowledge of mathematics, physics, chemistry, statistics, and the biology of plant and animal organisms and microorganisms. The expected learning outcomes can therefore be summarised as: an understanding of the fundamental aspects of the biology, physiology and ecology of organisms with particular reference to those of agricultural and forestry interest, including their genetic improvement and relationships with beneficial or pathogenic organisms and micro-organisms being able to read and understand advanced texts relating to the various aspects characterising the agrarian and agro-forestry environment in mountainous areas; being able to communicate and discuss issues relating to the training course in an appropriate manner in the three languages (Italian, English, German). The knowledge and comprehension skills listed above are achieved through participation in lectures, practical exercises, seminars, and through guided personal and individual study as envisaged by the training activities offered. Some courses in the syllabus may be offered in a dual mode (lectures face-to-face and in video-recorded

	form and made available on the university intranet platform). The assessment of the achievement of learning outcomes takes place mainly by means of exams and possible in -progress tests. The tests may be written and/or oral, and may also consist of reports and oral presentations of projects or seminars. Ability to apply knowledge and understanding In addition to acquiring a solid scientific-technological foundation, the ability to tackle new problems, both practical and real, is stimulated, with the aim of enabling the student to acquire a working method. The three-year graduate in sustainable agriculture and forest management in a mountain environment, thanks to a technical-scientific training integrated with economic-managerial subjects, must: knowing how to operate the farm properly; know how to transfer the acquired skills related to plant and animal production, crop protection and soil fertility into practice; know how to carry out diagnosis and integrated control programmes against pathogens and harmful agents; knowing how to handle the production of agricultural products; to know how to set up and manage sustainable agricultural/forestry systems in mountain environmental contexts, based on knowledge of agricultural production systems and their economic and marketing aspects, considering environmental impact, product quality and consumer health; The ability to apply knowledge is achieved through critical reflection on the texts proposed for individual study stimulated by classroom activities, the study of research and application cases shown by the lecturers, the performance of practical laboratory and field exercises, bibliographical research, individual and/or group projects as part of the fundamental and optional courses included in the teaching plan, as well as during the internship and preparation for the final examination. The tests carried out by means of written and/or oral examinations, reports and exercises include the performance of specific tasks in which the student demonstrates mastery of tools, methodologies and critical autonomy. In the internship activities, the verification takes place through the presentation of a report by the student to the teacher of reference.

	Making judgements At the end of their studies, graduates possess an awareness and autonomy of judgement that enable them to acquire the necessary information, and to assess its implications in a production, environmental and market context, to implement interventions to improve the quality, efficiency and sustainability of agricultural/forestry production processes. In accordance with the knowledge acquired, the graduate is able to make independent judgments on problems relating to the overall management of the agricultural enterprise and relevant to his or her professional activity; has the ability to critically evaluate issues related to the professional activity and is able to establish the most appropriate production and defence strategies for agricultural/forestry products, while respecting the environment. Autonomy of judgement is developed and verified through the exercise activities, the organised seminars, the preparation of papers as part of the teaching, as well as during the internship activity and the activity assigned by the lecturer for the preparation of the final examination. Communication skills "The graduate has the ability to use the most modern and effective means of communication to disseminate the research carried out and the analyses relating to the problems of agro-forestry and forest management; he/she is able to deal with the production realities in the agro-forestry sector and to interact with figures from the sector and related sectors. Communication skills are particularly developed during exercises, the organised seminars, as well as during training activities that also involve the preparation of reports and written documents and the oral presentation of the same. Since the course is trilingual, graduates are able to communicate correctly, in written and oral form, in Italian and in two other languages (German and English). In tutorial activities and seminars, students are encouraged to speak publicly in order to improve their ability to describe clearly and comprehensibly any doubts and/or requests for clarification on specific topics. The acquisition and evaluation/verification of the achievement of communication skills are also provided for during

	the internship and the final report, as well as when writing and discussing the final paper. Learning skills The degree course provides the basic cognitive tools indispensable for the continuous updating of knowledge, also with tools that make use of new communication and information technologies. The graduate is able to apply the developed learning methods and tools to update and deepen the studied contents, also in professional contexts and to undertake further studies.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	The overall mark of the course will be calculated as the average of the marks of the two modules. The assessment of the module Agricultural and Forest Entomology consists of two parts: -Written exam with multiple-choice and review questions (85%); -Insect collection (15%). The assessment of the module Phytopathology consists of two parts: -Written exam with review questions (70%); -Project work consisting of written lab reports, in which the results of the experiments are interpreted, and a presentation on a given topic, all performed in groups (30%). Both assessments, written exam and project work, need to be passed to successfully complete the module Phytopathology.
Evaluation Criteria	Criteria for the evaluation of the written exam: correctness of answers; ability to summarize, evaluate, and establish relationships between topics of relevance; develop critical and independent thinking. Criteria for the evaluation of the report on exercises and excursions: ability to work in a team, ability to summarize in own words, skills in critical thinking. Criteria for the evaluation of the project work: correctness of the contents, ability to summarise in own words, quality and clarity of presentation, and the ability to establish a context with other

	related topics.
Required Readings	Power Point presentations and additional teaching materials will be made available in the Microsoft-Teams group of the course and/or in the course reserve collection database.
Supplementary Readings	**Agricultural and Forest Entomology**: - Ang, G., & Ebert, K. (2025). Insect science. University of Queensland Open Textbooks. - Nation, J. L. (2025). Essential insect physiology: A textbook for undergraduates and graduates. CRC Press. - Gullan, P. J., & Cranston, P. S. (2020). The insects: An outline of entomology (5th ed.). Wiley-Blackwell. - Hari Prasad, K. V. (2022). *Insect ecology: Concepts to management*. Singapore, Springer. - Gillott, C. (2005). Entomology (3rd ed.). Springer. - Walter, G. H. (2003). *Insect pest management and ecological research*. Cambridge University Press. **Phytopathology**: - Oliver R. P. (Ed.) 2024. Agrios' Plant Pathology, 6th Edition. Academic Press, Oxford, 898 pp, ISBN: 978-0128224298, eBook ISBN: 9780323851350 - Schumann G. L. & D'Arcy C. J. 2012. Hungry Planet: Stories of Pant Diseases, APS Press St. Paul, MN, 294 pp, ISBN:978-0-89054-490-7 - Lucas J. A. 2020. Plant Pathology and Plant Pathogens, 4th Edition, Wiley- Blackwell, Chichester, UK, 432 pp, ISBN: 978-1-118-89385-2 - Schumann G. L. & D'Arcy C. J. 2009. Essential Plant Pathology, 2nd Edition, APS Press St. Paul, MN, 384 pp, ISBN: 978-0890543818
Further Information	
Sustainable Development Goals (SDGs)	No poverty, Zero hunger, Life on land, Quality education, Responsible consumption and production, Good health and well-being

Course Module

Course Constituent Title	Agricultural and Forest Entomology
Course Code	40225A
Scientific-Disciplinary Sector	AGRI-05/A
Language	English
Lecturers	Prof. Sergio Angeli, Sergio.Angeli@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/27643
Teaching Assistant	
Semester	Second semester
CP	5
Responsible Lecturer	
Teaching Hours	30
Lab Hours	20
Individual Study Hours	75
Planned Office Hours	15
Contents Summary	Fundamentals of entomology: structure, function, classification Insect identification Ecology and behavior of herbivores, predators, and parasitoids Examples of pest insects in crops, forestry and post-harvest Practical training in insect morphology, physiology, insect collection (insectarium), and chemical ecology
Course Topics	The course will cover the following topics: 1. Reasons for the evolutionary success of insects; 2. Insect taxonomy and nomenclature; 3. Arthropoda; 4. Insect classification: Apterygota, Exopterygota, Endopterygota; 5. Insect orders and the most relevant families; 6. Insect morphology: head, thorax and abdomen; 7. Types of mouthparts: chewing, piercing-sucking, rasping-sucking, sponging, siphoning, etc.; 8. Types of antennae, wings and legs; 9. Male and female reproductive systems and types of

	ovipositors; 10. Insect life cycles, development and metamorphosis; 11. Insect integument and cuticle; 12. Feeding and digestion; 13. Excretory, circulatory and respiratory systems; 14. Nervous system and sensory organs; 15. Insect chemical ecology: semiochemicals and pheromones; 16. Insect sampling and monitoring methods; 17. Insect natural enemies; 18. Introduction to Integrated Pest Management (IPM); 19. tIntroduction to the major insect pests affecting European agricultural and forest ecosystems.
Teaching Format	The module is a lecture-lab course in which topics are presented by the Professor. Practical parts, lab activities and excursions are explained by the Professor and the Teaching Assistants. Generally, Generally, Power Point presentations will be available on Microsoft Teams, in the dedicated channel for the course.
Required Readings	Teaching materials are available in the course reserve collection, along with additional resources provided by the professor.
Supplementary Readings	- Ang, G., & Ebert, K. (2025). Insect science. University of Queensland Open Textbooks. - Nation, J. L. (2025). Essential insect physiology: A textbook for undergraduates and graduates. CRC Press. - Gullan, P. J., & Cranston, P. S. (2020). The insects: An outline of entomology (5th ed.). Wiley-Blackwell. - Hari Prasad, K. V. (2022). *Insect ecology: Concepts to management*. Singapore, Springer. - Gillott, C. (2005). Entomology (3rd ed.). Springer. - Walter, G. H. (2003). *Insect pest management and ecological research*. Cambridge University Press.

Course Module

Course Constituent Title	Phytopathology
Course Code	40225B
Scientific-Disciplinary Sector	AGRI-05/B

Language	English
Lecturers	Prof. Dr. Sanja Baric, Sanja.Baric@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/1049 dr. Lavinia Carlini, Lavinia.Carlini@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/44844
Teaching Assistant	
Semester	Second semester
CP	5
Responsible Lecturer	
Teaching Hours	30
Lab Hours	20
Individual Study Hours	75
Planned Office Hours	15
Contents Summary	Concept of disease Environmental factors Parasitism and disease development: Viruses and viroids; Bacteria and mollicutes; Fungi and oomycetes; Parasitic plants; Plant-pathogenic nematodes Genetics of plant disease Mechanisms of pathogen attack and plant defence Epidemiology Diagnosis techniques
Course Topics	The module Phytopathology covers the following topics: Concept of disease in plants; types of plant diseases Impact of plant diseases Environmental factors that cause plant diseases Parasitism and disease development; stages in the development of disease: disease cycles Plant pathogenic viruses and viroids Plant pathogenic prokaryotes: bacteria and mollicutes Plant pathogenic fungi and fungal-like organisms: Zygomycetes; Ascomycetes; Basidiomycetes Plant pathogenic fungal-like organisms: Oomycetes

	Plant pathogenic nematodes and other parasitic organisms Genetics of plant disease: genetic variability; genetics of virulence in plant pathogens and resistance in host plants Mechanisms of pathogen attack and defense of plants against pathogens Epidemiology of plant diseases and population dynamics of pathogens Diagnosis techniques for plant pathogens
Teaching Format	This is a lecture-lab course with PowerPoint presentations and interactive elements, such as discussions and descriptive case examples. In the practical part, selected contents covered in the lectures, will be examined in greater depth in the field (during a didactic excursion) and in the laboratory. Short presentations on a topic of choice will be prepared by the students and presented to the class.
Required Readings	Power Point presentations and additional teaching materials will be made available in the Microsoft-Teams group of the course.
Supplementary Readings	- Oliver R. P. (Ed.) 2024. Agrios' Plant Pathology, 6th Edition. Academic Press, Oxford, 898 pp, ISBN: 978-0128224298, eBook ISBN: 9780323851350 - Schumann G. L. & D'Arcy C. J. 2012. Hungry Planet: Stories of Plant Diseases, APS Press St. Paul, MN, 294 pp, ISBN:978-0-89054-490-7 - Lucas J. A. 2020. Plant Pathology and Plant Pathogens, 4th Edition, Wiley- Blackwell, Chichester, UK, 432 pp, ISBN: 978-1-118-89385-2 - Schumann G. L. & D'Arcy C. J. 2009. Essential Plant Pathology, 2nd Edition, APS Press St. Paul, MN, 384 pp, ISBN: 978-0890543818