Syllabus

Course Description

Course Title	Entomology and Phytopathology
Course Code	40192
Course Title Additional	
Scientific-Disciplinary Sector	
Language	English
Degree Course	Bachelor in Agricultural, Food and Mountain Environmental Sciences
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
Teaching Assistant	
Semester	Second semester
Course Year/s	2
CP	12
Teaching Hours	72
Lab Hours	48
Individual Study Hours	180
Planned Office Hours	36
Contents Summary	The module Entomology is part of the core subjects of the Bachelor in Bachelor in Agricultural, Food and Mountain environmental Sciences. The frontal lectures will start by an introduction on fundamentals in entomology. Students are introduced to arthropod structures and functions, classification, identification, development, behaviour and ecology. Emphasis is placed on herbivores, predators and parasitoids occurring in agro-ecosystems. Methods of arthropod control, in particular biological control, are outlined and discussed. The practical part provides instruction in the insect morphology and

	physiology, identification of agriculture and forest relevant arthropod groups, mainly key pest insects occurring in agricultural and forest ecosystems. The module Phytopathology provides fundamental knowledge and skills in the field of plant pathology. Students are first introduced into the basic concepts and terminology of plant disease, followed by the abiotic and biotic causes of plant diseases as well as the biology of the major pathogen groups and the etiology of diseases they induce. Further emphasis will be put on the understanding of how phytopathogens interact with their host plants as well as the role of environmental and genetic factors for the development of disease. Students will also acquire theoretical and practical knowledge on different diagnostic techniques for the detection of phytopathogens. Finally, students will be acquainted with basic concepts in epidemiology and different strategies for plant disease management and control.
Course Topics	The module Entomology covers the following topics: Reasons of insect success; Insect taxonomy and nomenclature; Arthropoda; Insect classification: apterygota, exopterygota, endopterygota; Insect orders and most relevant families; Insect morphology: head, thorax and abdomen; Types of mouthparts: chewing, piercing-sucking, rasping-sucking, sponging, siphoning, etc.; Types of antenna, wings and legs; Male and female genital organs, types of ovipositors; Insect cycles, development and metamorphosis; Cuticle and insect integument; Feeding and digestion; Excretory, circulatory and respiratory; Nervous system, sensory organs; Insect chemical ecology: semiochemicals and pheromones; Insect sampling and insect monitoring; Insect natural enemies; Cultural, mechanical and chemical control of insects; Overview on insecticides; Toxicity, health and economic threshold; Integrated pest management (IPM) in fruit orchards; Sustainable agriculture and biological control;

	Introduction of key pest insects in European agriculture and forest ecosystems; Exotic pest insects; Case topics selected by the students. 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; Strategies for plant disease management and control
Keywords	arthropods, agroecology, plant pathogens, plant diseases, pest and disease control
Recommended Prerequisites	
Propaedeutic Courses	no
Teaching Format	The module Entomology is a lecture-lab course in which topics are presented by the lecturer. Practical parts, lab activities and excursions are explained by the lecturer and the teaching assistants. The module Phytopathology 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.
Mandatory Attendance	no
Specific Educational Objectives and Learning Outcomes	Entomology Knowledge and understanding Knowledge of the most important scientific aspects related to insects, with a particular focus on pest insects of agricultural and forestry ecosystems. Applying knowledge and understanding Be able to recognize and identify insect groups, in some cases at species level. Understand the differences in morphological and philological features of insects, there cycles and metamorphosis, in comparison to other animals groups. Be able to identify sign of damages and the impact of insects in agricultural production (e.g. orchards, forests, stored products). Understand the advantages and disadvantages of using insecticides, genetically modified plants in pest control, Integrated Pest Management and Biological Control techniques in order to minimize insect damage and economic agricultural losses. Making judgments Through the critical evaluation of knowledge. Through the critical evaluation of different strategy in pest control. Communication skills Ability to communicate the acquired knowledge by using a correct scientific and technical language. Learning skills Ability to extend the knowledge acquired during the study course by reading and understanding scientific and technical documentation. Ability to develop a critical thinking for the professional skills. Phythopathology: Knowledge and understanding Students will gain fundamental knowledge on the biology of economically important plant pathogens and the etiology of diseases, and understand how plant pathogens and their host plants interact in the environment. Applying knowledge and understanding Students will be able to recognise and identify disease symptoms

	and signs, and formulate hypotheses about the causes of diseases. Making judgements Students will gain the ability to make informed judgments about the appropriate diagnostic technique and develop a strategy for disease control. Communication skills Students will improve their writing abilities by preparing short laboratory reports. Communication and presentation skills will be enhanced during interactive classes and student presentations. Learning skills Students will learn to retrieve scientific literature and to autonomously extend the knowledge acquired during the course by reading and compiling technical and scientific documents.
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 Entomology consists of three parts: -Written exam with multiple-choice and review questions (if possible) (70%); -Presentation on a given topic (15%); -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	**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)	Responsible consumption and production, Zero hunger

Course Module

Course Constituent Title	Entomology
Course Code	40192A
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	6
Responsible Lecturer	
Teaching Hours	36
Lab Hours	24
Individual Study Hours	90
Planned Office Hours	18
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 of insect success; 2. Insect taxonomy and nomenclature; 3. Arthropoda; 4. Insect classification: apterygota, exopterygota, endopterygota; 5. Insect orders and 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 antenna, wings and legs; 9. Male and female genital organs, types of ovipositors; 10. Insect cycles, development and metamorphosis; 11. Cuticle and insect integument; 12. Feeding and digestion; 13. Excretory, circulatory and respiratory; 14. Nervous system, sensory organs; 15. Insect chemical ecology: semiochemicals and pheromones; 16. Insect sampling and insect monitoring; 17. Insect natural enemies; 18. Cultural, mechanical and chemical control of insects; 19. Overview on insecticides; 20. Toxicity, health and economic threshold; 21. Integrated pest management (IPM) in fruit orchards; 22. Sustainable agriculture and biological control; 23. Introduction of key pest insects in European agriculture and forest ecosystems; 24. Exotic pest insects; 25. Case topics selected by the students.
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	40192B
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. Hafiz Husnain Nawaz, HafizHusnain.Nawaz@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/48928
Teaching Assistant	
Semester	Second semester
CP	6
Responsible Lecturer	
Teaching Hours	36
Lab Hours	24
Individual Study Hours	90
Planned Office Hours	18
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 Strategies for plant disease management and control
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 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