COURSE OF STUDY Plant Medicine (LM69)

ACADEMIC YEAR *2023/2024*

ACADEMIC SUBJECT Functional entomology (I.C. Biodiversity and Ecosystem Services, total CFU: 9)

General information	
Academic subject	Functional entomology (I.C. Biodiversity and Ecosystem Services, total CFU: 9)
Degree course	Plant Medicine (LM69)
Academic Year	2023/2024
European Credit Transfer and Accumulation System (ECTS)	3
Language	Italian
Academic calendar (starting and ending date)	Second semester (26-2-24 – 14-06-2024)
Attendance	optional attendance

Professor/ Lecturer	
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Department and address	Ex Facoltà di Agraria (Campus)
Virtual headquarters	Teams
Tutoring (time and day)	Wednesdays from 15.30 to 17.30, by appointment (e-mail), at the Entomology and zoology section (see above), or on Teams/Skype/Zoom

Syllabus	
Learning Objectives	This course aims to provide an overview of the concepts of biodiversity, ecosystem functioning and ecosystem services, the importance of beneficial insects in agriculture (e.g., biological control of crop pests, insect pollination), how these can be supported in the farm and how this translates into more sustainable management of agroecosystems, knowledge of national and European strategies to support biodiversity and beneficial insects in agriculture.
Course prerequisites	Knowledge of general biology.
Contents	Concepts of functional biodiversity, ecological functions and ecosystem services in agroecosystems, interactions between organisms, population and community ecology. Main ecosystem services in agriculture provided by arthropods (biological control, pollination, nutrient cycling). Main characteristics of organisms providing ecosystem services in agriculture (predatory insects, parasitoids, spiders, mites, pollinators, detritivorous arthropods). Methodologies for sampling functional biodiversity and main drivers of biodiversity in agroecosystems (landscape ecology, fragmentation, invasion ecology, climate change). National and European strategies to support functional biodiversity.
Books and bibliography	• Notes of the lectures.

	• Presentations and other didactic material provided during the lessons.
Additional materials	Students will be provided with a copy of all presentations utilized for lectures, including also those eventually needed for the practical activities

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
75	16	14	45
ECTS			
3	2	1	
Teaching strategy			
	The subjects will be provided with several examples and illustrations by means of Power Point presentations, movies, practical drills in the classroom and laboratory. The course will be delivered in e-learning mode in case of need.		
Expected learning outcomes			
Knowledge and understanding on:	o Knowledge of the concepts of functional biodiversity and ecological functions, and of the main ecosystem services in agriculture provided by arthropods. o Knowledge of the characteristics of the main service-providing organisms. o Knowledge of the main drivers of biodiversity in agriculture. o Knowledge of the main methodologies for sampling and measuring data on functional biodiversity.		
Applying knowledge and understanding on:	o Knowledge of the best strategies for monitoring and conservation of functional biodiversity in agroecosystems and of the best management strategies to promote ecosystem services in agriculture in different contexts.		

Soft skills	• *Making informed judgments and choices*
	  o Formulation of 1) functional biodiversity monitoring plans and 2) strategies for the optimization of ecosystem services in agriculture.
	• *Communicating knowledge and understanding*
	  o Ability to describe and illustrate exhaustively, with appropriate terms, with a wealth of examples and links, the main aspects that characterize the concepts of functional biodiversity and ecosystem services related to insects.
	• *Capacities to continue learning*
	  o Ability of adapting the basic cognitive tools acquired during the teaching path to explain and solve multiple application problems and diversified case studies.		

Assessment and feedback	
Methods of assessment	The students enrolled in the academic year during which this module is offered, can have an intermediary exam during the teaching period of module. The result of this intermediary exam remains valid for the whole academic year and concurs to the final evaluation of the student. The intermediary exam will be given on the subjects treated during the lessons and the practical activities as reported in the Didactic Regulation of the course and which is correlated to the actual teaching period. The evaluation of the intermediary exam is expressed in thirtieths.

	At the end of the module teaching period, the students, who passed positively the intermediary exam, can give the final exam concerning on the subjects treated during the lessons and the practical activities since the intermediary exam, as reported in the Didactic of the course and which is correlated to the actual teaching period. Students who did not pass or give the intermediary exam will be examined on the whole subjects treated during the lessons and the practical activities and which is correlated to the actual teaching period. The intermediary and the final exams consist of an written examination (oral if necessary). The evaluation of the student is based on criteria previously fixed such as reported in the Didactic Regulation of the course.

Evaluation criteria	• *Knowledge and understanding*
	  o Ability to describe the concepts of functional biodiversity and ecological functions, of the main ecosystem services in agriculture provided by arthropods, of the characteristics of service-providing organisms, of the main drivers of biodiversity in agriculture and of the main methodologies for sampling and measuring data on functional biodiversity.
	• *Applying knowledge and understanding*
	  o Knowledge of the best strategies for monitoring and conservation of functional biodiversity in agroecosystems and of the best management strategies to promote ecosystem services in agriculture in different contexts.
	• *Autonomy of judgment*
	  o Formulation of 1) functional biodiversity monitoring plans and 2) strategies for the optimization of ecosystem services in agriculture
	• *Communicating knowledge and understanding*
	  o Ability to describe and illustrate exhaustively, with appropriate terms, with a wealth of examples and links, the main aspects that characterize the concepts of functional biodiversity and ecosystem services related to insects.
	• *Capacities to continue learning*
	  o Adaptation of the basic cognitive tools acquired during the module in order to explain and solve numerous applied problems and diversified case of study

Criteria for assessment and attribution of the final mark	The final grade is awarded out of thirty. The exam is passed when the grade is greater than or equal to 18.
Additional information	