

Innovation Development of Agrifood Systems (CLM IDEAS)

2023/2024

Biodiversity and ecosystem services in agriculture (I.C. Biodiversity mainstreaming in crop production, total CFU: 9)

General information	
Year of the course	2023/2024
Academic calendar (starting and ending date)	First semester (October 2022 - January 2023)
Credits (CFU/ETCS):	3
SSD	AGR/11, General and applied entomology
Language	English
Mode of attendance	optional attendance

Professor/ Lecturer	
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Department and address	Ex Facoltà di Agraria (Campus), 4° floor, room 13
Virtual room	Teams, Giovanni Tamburini
Office Hours (and modalities: e.g., by appointment, on line, etc.)	Wednesdays from 15.30 to 17.30, by appointment (e-mail), at the Entomology and zoology section (see above), or on Teams/Skype/Zoom

Work schedule			
Hours			
Total	Lectures	Hands-on (laboratory, workshops, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
75	16	14	45
CFU/ETCS			
3	2	1	

Learning Objectives	This course aims at giving an overview of the concepts of biodiversity, ecosystem functioning and ecosystem services and their development, how these can be measured and how this translates into more sustainable management of agroecosystems.
Course prerequisites	Knowledge of general biology.

Teaching strategie	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 in terms of	
Knowledge and understanding on:	<ul style="list-style-type: none"> ○ Knowledge and understanding the impacts of global change on biodiversity and ecosystem services in agriculture. ○ Knowledge and understanding of the main methodologies to sample and measure biodiversity data.
Applying knowledge and	<ul style="list-style-type: none"> ○ Ability to select the best monitoring and management strategies to

understanding on:	promote biodiversity and ecosystem services in agriculture.
Soft skills	<ul style="list-style-type: none"> • <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> ○ Ability to design monitoring plans for biodiversity considering the main drivers of biodiversity decline, and to identify potential measure for biodiversity conservation and ecosystem service promotion. • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ Ability of presenting monitoring plans and biodiversity related data. • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ Ability of updating the own knowledge on new monitoring and conservation strategies for farmland biodiversity. ○ The results of the expected learning, in term of knowledge and ability, are listed in the Annex A of the Didactic Regulation of the Bachelor Degree Course (expressed by the European descriptors of the study title).
Syllabus	
Content knowledge	<p>Knowledge of the origin and distribution of biodiversity in agroecosystems, concept of species, interactions among organisms, population and community ecology.</p> <p>Methodologies to sample and measure biodiversity data, and the main drivers of biodiversity (landscape ecology, fragmentation, invasion ecology, climate change).</p> <p>Ecosystem functioning and ecosystem services in agriculture and their relationships with biodiversity.</p>
Texts and readings	<ul style="list-style-type: none"> • Notes of the lectures. • Presentations and other didactic material provided during the lessons.
Notes, additional materials	Students will be provided with a copy of all presentations utilized for lectures, including also those eventually needed for the practical activities.
Repository	<i>Teams</i>

Assessment	
Assessment methods	<p>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 in Agricultural Science and Technology (art. 9) and syllabus (annex A) and which is correlated to the actual teaching period. The evaluation of the intermediary exam is expressed in thirtieths.</p> <p>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 Regulation in Agricultural Science and Technology (art. 9) and syllabus (annex A) 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 as reported in the Didactic Regulation in Agricultural Science and Technology (art. 9) and syllabus (annex A) 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 Annex A of the Didactic Regulation in Agricultural Science and Technology.</p>
Assessment criteria	<ul style="list-style-type: none"> • <i>Knowledge and understanding</i> <ul style="list-style-type: none"> ○ Description of the concepts of biodiversity and ecosystem services, of the main

	<p>drivers of biodiversity and ecosystem services in agriculture, and of the main methodologies to sample and measure biodiversity data.</p> <ul style="list-style-type: none"> • <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> ○ Description of the best monitoring and conservation strategies for farmland biodiversity and of the best management strategies to promote ecosystem services in agriculture in different contexts. • <i>Autonomy of judgment</i> <ul style="list-style-type: none"> ○ Formulation of potential 1) monitoring plans for biodiversity and 2) strategies for the optimization of ecosystem services in agriculture. • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ Exhaustive description and illustration, with appropriateness of term, richness of examples of the concepts of biodiversity and ecosystem services. • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ Adaptation of the basic cognitive tools acquired during the module in order to explain and solve numerous applied problems and diversified case of study
Final exam and grading criteria	The final grade is awarded out of thirty. The exam is passed when the grade is greater than or equal to 18.
Further information	