General information	
Academic subject	Didactics of Ecology
Degree course	Environmental Biology
Academic Year	*2021-2022*
European Credit Transfer and Accumulation System (ECTS)	4
Language	*Italian*
Academic calendar (starting and ending date)	second semester, 7 March 2022-9 June 2022
Attendance	strongly recommended

Professor/ Lecturer	
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Tutoring (time and day)	Monday 11-13

Syllabus	
Learning Objectives	The **aim** of the course is to present the contents through the methods of ecology with a didactic approach directed to secondary school students, solving the problems about the teaching of this scientific discipline for which the contents do not make the methods but through the methods one can get to the contents.
Course prerequisites	*Basic knowledge in Mathematics, Physics, General Chemistry, Animal and Plant Biology, Ecology.*
Contents	Issues of ecology education. Ecology, environment and teaching. Ecology and interdiscipli narity. Ecology, the science of complexity. The importance of systematic knowledge, laboratory and field activities. The Ecosystem. An educational project to study the ecosystem: components, factors and functioning. From frontal lessons to field observation. System meaning and related examples. Examples of ecosystems and structural components. Organisms and environment interactions. Laboratory and field experiences. Effectiveness of multimedia tools for the organization and analysis of environmental data through the use of computer. The use of models in ecology: from models to conceptual maps. The flow of energy in ecosystems. Didactic methodology for learning energy flow in ecosystems. Laboratory didactic as a method for learning primary productivity and measurement methods in terrestrial and aquatic environments. Examples of energy transfer in food webs. "Who eats what" in the sea and on earth. Teaching methods of food webs through practical laboratory experiments, such as analysis of stomach contents in marine organisms. The circulation of matter in ecosystems. Didactic methods aimed at teaching the main biogeochemical cycles of the matter. Decomposition in ecosystems. Laboratory and field experiences. Biotic components of the ecosystem

	Populations: educational pathways for teaching the ecology of populations: from descriptive to modeling approach. Communities: Examination of the effectiveness of teaching tools for understanding the nature of interactions between species: observations on commensalism, mutualism, competition, predation and parasitism. Methodologies aimed at learning biodiversity in ecosystems. Teaching approach for the teaching of environmental degradation: from catastrophism to the systemic approach for the correct understanding of environmental degradation phenomena. New teaching model: from environmental education to sustainable development, natural capital and ecosystem goods and services
Books and bibliography	Gianfranco D'Onghia – Appunti di Ecologia e Spunti di Sostenibilità – libreriauniversitaria.it Ed. T.M. Smith, R.L. Smith - Elementi di Ecologia - Pearson Ed.
Additional materials	The student is invited to investigate particular topics also with other contributions available on the web.

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
100	24	8	68
ECTS			
4	3	1	

Teaching strategy	Lectures and seminars; direct experience acquired during laboratory and field exercises.
Expected learning outcomes	
Knowledge and understanding on:	To acquire the methods for the knowledge of ecological systems (populations, communities and ecosystems) with a holistic overview and in which the interaction between abiotic and biotic components plays a decisive role in the functioning and regulation mechanisms of the ecological systems.
Applying knowledge and understanding on:	Application of the acquired knowledge for the Ecology teaching in Secondary School, through frontal teaching, observations and experimental surveys, laboratory experiments, and organization, analysis and evaluation of ecological data.

Soft skills	• *Making informed judgments and choices*
	  ○ Acquisition of autonomy in the evaluation and interpretation of experimental data, as well as in the promotion of investigations and educational experiences that can facilitate the acquisition of knowledge.
	• *Communicating knowledge and understanding*
	  ○ Ability to spread the knowledge gained on methods and contents of ecology to secondary school students, promoting constructive discussion on ecology issues.
	• *Capacities to continue learning*
	  ○ Acquisition of methodological skills in addressing the ecology teaching to arrive at the contents of this scientific discipline, fueling

	the desire for knowledge and promoting learning through the involvement of secondary school students in the various educational activities.

Assessment and feedback	
Methods of assessment	Oral examination. Presentation of an ecology lesson for students of Secondary School.

Evaluation criteria	• *Knowledge and understanding*
	  ○ Check of the acquisition of methods for the knowledge of ecological systems, their functioning and their regulation
	• *Applying knowledge and understanding*
	  ○ Check of the acquired knowledge for the purpose of teaching ecology in the Secondary School through frontal and field teaching.
	• *Autonomy of judgment*
	  ○ Check the acquisition of autonomy in the interpretation of field observations and experimental data, as well as in the promotion of investigations and didactic experiences.
	• *Communication skills*
	  ○ Check the ability to disseminate the knowledge acquired on the methods and contents of ecology to secondary school students.
	• *Capacities to continue learning*
	  ○ Check the acquisition of methodological skills in teaching by promoting learning through the involvement of secondary school students in the various educational activities.

Criteria for assessment and attribution of the final mark	Clarity, correctness and completeness of the presentation associated with the critical and holistic sense of presenting the topics are the criteria for measuring learning and attribution of marks. The final mark is awarded out of thirty. The exam is passed when the mark is greater than or equal to 18.
Additional information	