Studying Natural Sciences at the

UNIVERSITÀ DEGLI STUDI DI MILANO

The Department of Biosciences is both principal and associate coordinator of different Bachelor or Master Degree courses in the areas of Biotechnologies, Biological sciences and Natural Sciences.

Teaching coordination for Bachelor degree in Natural Sciences and master degree in BioGeosciences: Ecosystems Analysis and Science Communication is shared with the Department of Earth Sciences Ardito Desio and they are within the Faculty of Science and Technology.

Faculty Sciences and Technology

https://www.unimi.it/en/education/faculties-and-schools/science-and-technology

Natural Sciences

Head of the departmental teaching board of Natural Sciences: Prof. Lucia Angiolini (email: lucia.angiolini@unimi.it)

For details on course programs, course timetable and optional courses activation visit the website:
https://www.unimi.it/en/education/natural-sciences

https://www.unimi.it/en/education/biogeosciences-analysis-ecosystem-and-science-communication

International Mobility and Promotion Office
Via Santa Sofia 9 – 20122 Milano
https://www.unimi.it/en/ugov/ou-structure/international-mobility-and-promotion-office

Erasmus coordinator
Prof. Morena Casartelli (email: morena.casartelli@unimi.it)
Department of Biosciences, via Celoria 26 – 20133 Milano

Student Registry office:
via Celoria, 18 - 20133 Milano
https://www.unimi.it/en/study/student-services/welcome-desk-infostudenti

Secretariat for teaching activities:
Via Mangiagalli, 34 – 20133 Milano
e-mail: cclsn@unimi.it

Course location:
via Celoria 20-26 - Milano
via Golgi 19 - Milano
via Mangiagalli 34 – Milano
via Botticelli 23 – Milano

Grading: The University Educational Credits.

Degree courses are structured in University Educational Credits (crediti formativi universitari – CFU). A university credit corresponds to 25 hours of work per student, time for personal study included. The average annual workload of a full time student is conventionally fixed at 60 credits.

*1 CFU equals 1 ECTS.

To obtain the credits the student must pass the final exam Min. 18/30=sufficient grade Max 30/30= excellent grade.

Bachelor Degree in Natural Sciences

Classification of Scholarly Field**: L 32** Environmental sciences

Degree program duration: 3 years (180 CFU)
Attendance: Mandatory

Degree coordinator: Prof. Lucia Angiolini

Website:
https://www.unimi.it/en/education/natural-sciences

Course Objectives

Aim of this course is to offer a balanced synthesis of knowledge and methods both in the biologic area and in the earth-sciences, which are the bases for professional activities concerning the interpretation and the protection of the recent natural world and its past evolution, focusing specifically on the correlation between organisms, substrate and environment. The course is aimed to provide the students with an exhaustive learning of the natural world as well as the experimentation of the scientific method for the study of the biologic components, their mutual interactions, and their interactions with the physical environment; it will prepare graduates which will be able to correctly interpret both the biotic and abiotic factors of the environment and their interactions. The studies are widely multidisciplinary, ranging from biology to geology and to geography, with robust bases of chemistry and physics.

The course is focused on:

- zoological and botanical aspects of the natural world, presented from a systematic, physiological and genetic standpoint
- the life-forms of the past and the evolution of species
- an awareness of functional adaptations to different environments
- the geological substrata of natural biological communities and their morphogenetic processes, both in standard current and past forms, and in forms modified by natural or human-caused causes
- the interactions between organisms, the substratum and climate of the ecosystem and the interactions between ecosystems.

Career and Employment
The course is aimed to prepare graduates who could have access to works with technical and professional functions in surveys and in the analysis, classification, preservation and recovery of the biotic components of the aquatic and terrestrial ecosystems. These activities could be carried out in parks, natural reserves, museums, and teaching institutions. Graduates in this discipline could also be employed in the analysis and monitoring of systems and biological processes both in natural settings and in anthropic ones, in order to preserve the natural environment, to check and ameliorate its quality, to identify and protect the natural and cultural heritage.

STUDY PLAN

1st Year

Semester	Teaching plan: mandatory courses	CFU*
annual	Botany	12
annual	Chemistry	10
annual	Fundamental of mathematics and statistics	12
annual	Zoology	12
1st	General and environmental biology with elements of Histology	8
1st	Physical geography and cartography	8
1st	English assessment B1	2
2nd	Physics	6

2nd Year

Semester	Teaching plan: mandatory courses	CFU*
annual	Ecology and behavioral ecology	15
1st	Comparative anatomy	7
1st	Genetics	8
1st	Mineralogy	6
1st	Paleontology	6
2st	Petrography	6
2nd	General and environmental physiology	8
2nd	Geology	6

The student must acquire **8 credits,** during the second and the third academic year, choosing between the following activities: stage in laboratory or natural field training or internship

3rd Year

Semester	Teaching plan: mandatory courses	CFU*
2st	Geographic Information System	6
2nd	Evolutionary biology	6

The student must acquire **12 credits** from the courses listed below choosing no more than one course in the area "Environment":

Semester	Teaching plan	CFU*
1st	Freshwater biology	6
1st	Developmental biology	6
1st	Nature conservation	6
1st	General entomology	6
1st	Geopedology	6
1st	Environmental microbiology	6
1st	Vertebrate zoology	6
2st	Anthropology and archaeological excavation	6
2st	Geomorphology	6
2nd	Quaternary climate changes	6
2nd	Climatology	6
2nd	Plant physiology	6
2nd	Geobotany	6
2nd	Vascular plants (the course will not be held in the Academic year 2020-21)	6
2nd	Paleontology heritage and excavations	6
2nd	Mineral resources and environmental interactions	6

Free-choice courses

The student must acquire **12 credits** freely choosing between all the teachings activated by the University, provided culturally consistent with his training and not overlapping in content to the fundamental and optional teachings already used in the study plan. The student can also choose between the optional unused teachings of the Natural Sciences degree.

3rd Year

Semester	Mandatory activity	CFU*
2nd	final exam: individual work	4

Master Degree in Biogeosciences: analysis of ecosystem and science communication

Classification of Scholarly Field**: LM 60 Nature sciences**

Degree program duration: 2 years (120 CFU)
Attendance: Mandatory

Master Degree coordinator: Prof. Lucia Angiolini

Website:
https://www.unimi.it/en/education/biogeosciences-analysis-ecosystem-and-science-communication

Course Objectives

The master's degree course in BioGeosciences: Analysis of ecosystems and Science communication aims to provide an in-depth, interdisciplinary and multidisciplinary knowledge of the structural and functional components of ecosystems in the present - also in relation to the anthropic presence - and in the geological past. It is aimed to show the conceptual tools for environmental conservation, defense and management, to provide knowledge and methodologies for the dissemination, communication and teaching of Natural Sciences. The course is addressed to students who want to extend and deepen their culture in the field of nature and environment, maintaining the traditional balance between abiotic and biotic factors, to obtain an organic and synthetic vision of nature and environment. The master's degree course addressed to students who intend to work in the field of training, communication and teaching of Natural Sciences.

The Master's programme is organized in two curricula:
- Ecosystem analysis, monitoring and management
- Science communication, dissemination and teaching

Career and Employment

Career opportunities for master's degree in BioGeosciences: Analysis of ecosystems and Science communication can be found in the public sector and in the private sector. In addition, the degree allows access to PhDs and II level masters. Graduates in curriculum Ecosystem analysis, monitoring and management will be able to perform monitoring of biotic naturalistic components (flora and fauna with particular reference to species indicated in the EU directives and to the alien species, habitats of community interest) and abiotic (rocks, geological structures, landscape forms with particular reference to the enhancement and geoconservation) on behalf of institutions responsible for the management of the territory and the natural heritage (regions, municipalities, other public and private agencies, parks and reserves) and as freelance. Graduates in curriculum Science communication, dissemination and teaching will be able to perform activities for the dissemination of knowledge of the natural ecosystems of the present and of the geological past; environmental education activities in schools and institutions, parks and organizations; preparation of exhibitions on nature and environment; awareness-raising activities on sustainable development. Furthermore, the degree course provides adequate preparation for teaching scientific disciplines and the suitable background to participate in the competition for access to the role of teacher of secondary school, according to current Italian

legislation. The course, after passing a specific state exam allows to enroll in the professional registers of graduate agro-technician and graduate agricultural expert.

CURRICULUM IN: Ecosystem analysis, monitoring and management

STUDY PLAN (*Course taught in English)

1st Year

Semester	Teaching plan: mandatory courses	CFU*
annual	Methods in ecosystem analysis	12

The student must acquire **42 credits** (7courses) from the courses listed below:

Semester	Teaching plan: one or two courses from the list below	CFU*
1st	Astronomy	6
1st	Environmental Chemistry	6
1st	Geographic Information Systems and Environmental modelling	6

Semester	Teaching plan: one course between the two	CFU*
1st	Population Biology and Genetics	6
2nd	Environmental Economics and Policy	6

Semester	Teaching plan: one course from the list below	CFU*
1st	Quantitative Ecology	6
2nd	Alpine glaciology and Climatology*	6
2nd	Plant ecology*	6
2nd	Applied Geomorphology	6
2nd	Geomorphological heritage and Geodiversity	6

Semester	Teaching plan: two or three courses from the list below	CFU*
1st	Geological Evolution of a habitable planet*	6
1st	Environmental Geochemistry	6
1st	Stratigraphy Paleontology	6
2nd	Biomineralization	6
2nd	Gemology	6
2nd	Geology of the Mediterranean area	6
2nd	Applied Paleoecology	6
2nd	Vertebrate paleontology	6

Semester	Teaching plan: two or three courses from the list below	CFU*
1st	Phylogeny and Evolution	6
1st	Biogeography	6
1st	Animal behavior	6
1st	Applied Geobotany	6
1st	Wildlife management	6
1st	Palynology	6
2nd	Anatomy and physiology of the integrated systems	6
2nd	Adaptation of animals and plants to environment	6
2nd	Laboratory methods for biodiversity*	6

The student must acquire **12 credits** (2 courses) from the courses listed below:

Semester	Teaching plan	CFU*
1st	Anthropology	6
1st	Geophysics for natural risks	6
1st	Mathematical modelling	6

2nd	Forensic sciences	6
2nd	Principles and Dynamics of the "Critical zone"	6
2nd	Control strategies for insect pest and vectors	6
2nd	Micropedology Laboratory	6
2nd	Symbiosis and parasitism	6

Semester		CFU*
2nd	English advanced B2	3

Free-choice courses

The student must acquire **12 credits** freely choosing between all the teachings activated by the University, provided culturally consistent with his training and not overlapping in content to the fundamental and optional teachings already used in the study plan. The student can also choose between the optional unused teachings of the master. The master degree offers also this optional course:

Semester	Mandatory activity	CFU*
annual	final exam	39

CURRICULUM IN: Science communication, dissemination and teaching

STUDY PLAN (*Course taught in English)

1st Year

Semester	Teaching plan: mandatory courses	CFU*
annual	Teaching methodologies and techniques for Biogeosciences	12

The student must acquire **42 credits** (7courses) from the courses listed below:

Semester	Teaching plan: one or two courses from the list below	CFU*
1st	Astronomy	6
1st	Communication and teaching of Mathematics	6
1st	Geographic Information Systems and Environmental modelling	6
2nd	Geometry in natural and anthropic environmental and its teaching	6

Semester	Teaching plan: one or two course from the list	CFU*
1st	Fundamentals of Psychology	6
1st	General Pedagogy	6
2nd	Environmental Economics and Policy	6
2nd	Methods of communication	6

Semester	Teaching plan: one course from the list below	CFU*
2nd	Applied Geomorphology	6
2nd	Geomorphological heritage and Geodiversity	6
2nd	Plant ecology*	6

Semester	Teaching plan: two or three courses from the list below	CFU*
1st	Geological Evolution of a habitable planet*	6
1st	Stratigraphy Paleontology	6
2nd	Geology of the Mediterranean area	6
2nd	Vertebrate paleontology	6

Semester	Teaching plan: two or three courses from the list below	CFU*
1st	Phylogeny and Evolution	6

1st	Biogeography	6
2nd	Anatomy and physiology of the integrated systems	6
2nd	Human Anatomy	6
2nd	Cell Biology	6

The student must acquire **12 credits** (2 courses) from the courses listed below:

Semester	Teaching plan	CFU*
1st	Anthropology	6
1st	Social Antropology	6
1st	Mathematical modelling	6
1st	History and teaching of Fisics	6
1st	Urban and regional geography	6
2nd	Communication, dissemination and teaching of Natural Sciences	6
2nd	Elementary mathematics teaching workshop	6
2nd	Symbiosis and parasitism	6

Semester		CFU*
2nd	English advanced B2	3

Free-choice courses

The student must acquire **18 credits** freely choosing between all the teachings activated by the University, provided culturally consistent with his training and not overlapping in content to the fundamental and optional teachings already used in the study plan. The student can also choose between the optional unused teachings of the master. The master degree offers also this optional course:

Semester	Mandatory activity	CFU*
annual	final exam	33

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