



**UNIVERSITA' DEGLI STUDI DI MILANO**  
**PROGRAMME DESCRIPTION - ACADEMIC YEAR 2026/27**  
**BACHELOR**  
**NATURAL SCIENCES (Classe L-32 R)**  
**Enrolled in 2026/2027**

### HEADING

<b>Degree classification - Denomination and code:</b>	L-32 R
<b>Degree title:</b>	Dottore
<b>Length of course:</b>	3 years
<b>Total number of credits required to complete programme:</b>	180
<b>Years of course currently available:</b>	1st
<b>Access procedures:</b>	Cap on student, student selection based on entrance test
<b>Course code:</b>	FAK

### PERSONS/ROLES

#### Head of Interdepartmental Study Programme

Prof.ssa Morena Casartelli

#### Degree Course Coordinator

Prof.ssa Morena Casartelli

#### Tutors - Faculty

Tutor orientamento e piani di studio - Maria Rose Petrizzo, Diego Rubolini, Paolo Tremolada, Carlo Polidori, Cristina Bonza, Marco Caccianiga, Francesco Bonasoro

Tutor per la mobilità internazionale e l'Erasmus - Silvia Caccia

Tutor per stage e tirocini - Irene Maria Bollati

Tutor per trasferimenti - Cristina Bonza, Alessia Colombo

Tutor per riconoscimento crediti - Cristina Bonza, Alessia Colombo

#### Degree Course website

<https://scienze naturali.cdl.unimi.it/it>

#### Course management

via Botticelli 23 <https://informastudenti.unimi.it/>

#### Disability academic tutor: Prof. Guglielmina Diolaiuti

Email: [guglielmina.diolaiuti@unimi.it](mailto:guglielmina.diolaiuti@unimi.it)

#### Libraries

<https://www.unimi.it/it/studiare/biblioteche>

#### Student registrar

via Celoria 18 Phone 0250325032 <https://www.unimi.it/it/node/360> <https://www.unimi.it/it/node/359> <https://informastudenti.unimi.it/>

### CHARACTERISTICS OF DEGREE PROGRAMME

#### General and specific learning objectives

In line with the qualifying learning objectives of the corresponding degree class, the Bachelor's degree programme in Natural Sciences aims to offer students a balanced synthesis between theoretical knowledge and methodological practice in the fields of biology and geology. Such expertise is essential for professional activities concerning the interpretation and protection of all elements of the past and present natural world, and highlighting the correlations between organisms, host substrate and the environment.

The programme is designed with the following objectives:

- Provide a systemic understanding of nature as well as robust practical experience in applying the scientific method to analyse biological components, their mutual interactions and their interactions with the chemical and physical environment;
- Prepare graduates that are able to study the biotic and abiotic components of the natural world, as well as their interactions.

The degree programme notably covers a highly cross-disciplinary range of topics, from biology to geology and geography, including fundamentals of mathematics, chemistry and physics;

- Prepare graduates that are able to work in a team as well as autonomously, and to smoothly integrate in any work environment;
- Prepare graduates that are able to use at least one language of the European Union other than Italian in their specific field of expertise and for general communication;
- Provide graduates with the necessary tools to access further educational and personal development opportunities, including teaching-oriented Master's degree programmes.

The degree programme requires students to gain oral and written proficiency in English.

Students will also become skilled in processing naturalistic data using mathematical and statistical techniques applicable to biotic and abiotic contexts. Moreover, they will acquire skills to identify living organisms, substrate types and landforms, to plan protocols and experimental procedures, and to properly write reports in different areas of natural sciences, such as surveys and analyses of the flora, fauna and morphology of the land or, more generally, methodological and experimental procedures for a cross-disciplinary study of organisms, the present environment and the geological past. Graduates will be able to autonomously assess and interpret experimental data, to choose the appropriate techniques for the analysis of environmental and natural components, as well as to apply the principles of professional ethics and a scientific approach to bioethical issues. Moreover, graduates will acquire verbal and written communication skills to be able to address both experts in the field and the general public, using the appropriate language register according to the different circumstances.

### **Expected learning outcomes**

Graduates are expected to acquire:

A: knowledge and understanding:

- knowledge of the fundamentals of mathematics, statistics, computer science, physics and chemistry aimed at the acquisition of the basic features of the disciplines to be used in different working areas and/or during the continuation of the studies (Master);
- knowledge of biological disciplines to understand the diversity of living organisms, their organization and the mechanisms underlying their functioning, also in an evolutionary framework;
- knowledge of ecological disciplines to understand the relationships between plants and animals and the environment in which they live;
- knowledge of the disciplines of Earth Sciences to understand the processes acting on our planet both in the present and in the geological past;
- knowledge of agricultural, management and communication disciplines for the acquisition of fundamental skills for land management in natural and man-made contexts and for understanding and interpreting the natural world in its biotic and abiotic component.

B: application skills:

- ability to process naturalistic data using mathematical and statistical techniques and to apply basic analytical techniques to the different contexts of the natural sciences.
- ability to identify living organisms, the nature of the substrate and the shapes of the landscape, to interpret and use topographic maps for the analysis of the territory, and to process these elements through geographic information systems, to plan protocols and experimental procedures, to apply them, and write reports in the different areas of Natural Sciences, such as surveys and analysis of the vegetation, fauna and geomorphology, or methodological and experimental procedures for the analyses of living organisms and the environment in the present and in the geological past;
- ability to use different IT tools with their main applications
- ability to use the English language efficiently.

C: autonomy of judgment:

- ability to evaluate and interpret experimental data;
- ability to use appropriate laboratory and field safety tools;
- ability to choose the appropriate techniques for analyzing the components of the environment;
- ability to apply the principles of professional ethics and the scientific approach to bioethical issues.

D: communication skills:

- ability to use different IT tools to communicate effectively to experts and non-experts;
- ability to communicate orally and in writing with a public of experts and with a general public, using language-appropriate registers to each circumstance;
- ability to use different IT tools with their main applications;
- ability to work in a team and to operate independently.

E: ability to learn:

- knowledge of scientific updating tools for the Natural Sciences disciplines;
- ability to consult databases;
- ability to access scientific literature produced in at least one European language in addition to one's own.

### **Professional profile and employment opportunities**

The aim of the degree programme is to train graduates who can: perform professional and technical-operational tasks for the identification and classification of processes and phenomena that had, or are having, an impact on the territory; collect, store

and process data; define sampling criteria; identify living organisms, substrate types and landforms; organise environmental planning and control activities. This is done with a view to preparing students to enter the world of work right after graduating. The above-mentioned skills can be applied in national and local public administrations dealing with the territory, at research entities and private companies involved in the monitoring of the territory and its resources, as well as by freelancers.

Graduates will also be able to perform professional and technical-operational tasks for the management of natural systems and agri-ecosystems, and take on management and technical assistance roles in parks and natural reserves, farms and cooperatives, as well as in public administrations, research entities and private companies involved in the management and recovery of the territory and its resources.

Graduates will be able to identify protocols and analytical methods to plan laboratory tests and will be familiar with the most common analysis techniques for the characterisation of natural materials. These activities may be undertaken at research centres and public and private analysis laboratories of the agri-food, environmental and pharmaceutical sectors.

Graduates will be able to provide support for the protection of cultural, botanical, zoological, palaeontological and geo-archaeological heritage, and to enhance collections and natural and cultural resources. To this end, they may work at science museums, botanical gardens, teaching and dissemination centres, research entities and private companies involved in the management of cultural and natural heritage.

Finally, graduates will be able to: disseminate knowledge regarding current ecosystems and ecosystems of the geological past; promote environmental education in schools; set up exhibitions on nature; raise awareness on sustainable development. Employment opportunities for this kind of activities are to be found in museums, parks, schools, publishers, public administrations, research entities and private companies active in knowledge dissemination and ecosystems management and protection.

## Professional profiles

### Expert in the collection and monitoring of naturalistic data

Job function: to collect data on the field; to produce thematic cartography; to classify, analyse and monitor biotic and abiotic components of the aquatic and terrestrial ecosystems.

Professional skills: ability to fulfil professional and technical-operational tasks so as to cooperate in the identification and classification of processes and phenomena that had, or are having, an impact on the territory; data collection skills, data storage skills and basic data processing skills; ability to define sampling criteria. Ability to identify animals and plants.

Career opportunities: public administrations (at the national and local level) that deal with the territory; research entities and private companies involved in the monitoring of the territory and its resources. Freelance professional activity.

### Expert in the management of natural areas and agricultural ecosystems

Job function: to analyse and monitor systems and biological processes both in natural and anthropic settings, in order to preserve the natural environment and improve its quality; to preserve and restore the biotic components of aquatic and terrestrial ecosystems; to provide technical support in environmental planning and control; to provide specialised support to protect and recover areas at risk.

Professional skills: ability to fulfil professional and technical-operational tasks so as to cooperate in the management of natural systems and agroecosystems

Career opportunities: management and technical assistance roles in parks and natural reserves, farms and cooperatives; public administrations (at the local and national level) for land management and recovery; research entities and private companies involved in the management of the territory and its resources. Freelance professional activity.

### Expert in the laboratory analysis of biological and geological materials

Job function: to analyse biotic and abiotic components of natural ecosystems; to define physical-chemical and biological properties of materials (characterisation); to serve as quality controller; to employ natural materials in industry.

Professional skills: ability to identify the right protocols and analytical methods to plan laboratory analyses; knowledge of the main analytical techniques for characterisation of natural materials.

Career opportunities: public and private research centres and analysis laboratories of the agri-food and environmental sectors, as well as of the pharmaceutical industry. Public administrations (at the local and national level) dealing with material characterisation and providing operational support to research entities. Freelance professional activity.

### Expert in the management and conservation of museum collections

Job function: to provide support for the protection of the cultural, botanical, zoological, palaeontological and geo-archaeological heritage; to enhance collections and the natural and cultural heritage.

Professional skills: ability to classify biotic and abiotic natural elements; data storage, processing and enhancement; knowledge of exposition techniques.

Career opportunities: science museums, botanical gardens and teaching and dissemination centres; operational support roles for research entities and private companies involved in the management of cultural and natural heritage. Freelance

professional activity.

Expert in the dissemination of natural sciences

Job function: to disseminate knowledge regarding current ecosystems and ecosystems of the geological past; to promote environmental education in schools; to set up naturalist exhibitions; to raise awareness on sustainable development.

Professional skills: knowledge of biotic and abiotic components of fossil and current ecosystems and their evolution in the history of Earth; knowledge of the impact of human beings on ecosystems.

Career opportunities: museums; parks; schools; public administrations (at the local and national level) dealing with knowledge dissemination; research entities and private companies involved in the management and protection of the ecosystems. Freelance professional activity.

Provided that they pass the corresponding state exam and enrol in the relevant professional register, graduates may access the following state-regulated professions:

Graduated agricultural technician

Junior biologist

Graduated agricultural expert

Junior planner

### **Initial knowledge required**

Admission to the bachelor's degree program in Natural Sciences is open to candidates who hold a secondary school diploma or other qualification obtained abroad that is recognized as suitable, as well as to those with an adequate initial preparation. The degree program in Natural Sciences has a programmed number in order to ensure the quality of the educational offerings in relation to available resources and provides for a TOLC (Test On Line CISIA) as a test for access. The test is designed to ascertain that students' preparation meets the minimum requirements of basic knowledge in scientific disciplines. A total of 300 places are available for enrollment in the first year.

The TOLC can be taken at the University of Milan or any other university that is a member of CISIA (Consorzio Interuniversitario Sistemi Integrati per l'Accesso). Registration for the TOLC should be done on the CISIA website ([www.cisiaonline.it](http://www.cisiaonline.it)). The TOLC valid for enrollment in the Bachelor of Natural Sciences program is the TOLC-S. Test structure and topics and other useful information are available at <https://www.cisiaonline.it/area-tematica-tolc-scienze/struttura-della-prova-e-sillabo/>

Entry requirements and the announcement are available at <https://scienze naturali.cdl.unimi.it/it/iscrivarsi>.

Students who having taken the TOLC-S will have enrolled in the selection for admission to the Bachelor of Science in Natural Sciences program will be placed in the merit list, formulated on the basis of their score on the test. Students usefully placed in the merit list must finalize their matriculation by the deadlines indicated in the announcement. Freshmen who do not achieve a score greater than or equal to 10 in the Basic Mathematics module will be assigned Additional Educational Obligations (OFAs).

Access for transfer or already graduated students.

Students already enrolled in a degree program at the University of Milan, at another University or already graduated, may be exempted from the test only if admitted to years subsequent to the first, but only if they meet the minimum requirements, i.e., at least 24 CFUs recognizable as exams of the Degree Course, of which 12 can be validated for the Institutions of Mathematics and Statistics exam. For this purpose, a special request for prior career evaluation must be submitted by accessing the online service indicated in the admission notice. Interested parties should declare all exams taken with relevant scientific disciplinary fields, credits and grades and attach course syllabi.

For more details on the procedure and dates and deadlines, please refer to the announcement.

Students admitted to the first year will have to take the TOLC test.

Additional educational obligations and arrangements for OFA remediation.

For students with OFAs, supportive activities will be organized, followed by a remedial test by which the student must demonstrate that he/she has improved his/her preparation. In the absence of this evidence, the student will not be allowed to take any second-year exams before passing the Institutions of Mathematics and Statistics exam (link: <https://scienze naturali.cdl.unimi.it/it/studiare/le-matricole>).

Information on registering for the degree program is available at <https://www.unimi.it/it/studiare/frequentare-un-corso-di-laurea/iscrivarsi/iscrivarsi-una-prima-laurea>.

### **Compulsory attendance**

Attendance to didactic activities including laboratories, field activities, internships which provide credits, is compulsory.

### **Degree programme final exams**

The final examination consists of the presentation and discussion of a written paper related to experimental activity or the report connected with a practical internship. This paper plays a formative role that completes the three-year individual course of study. The paper is not required to be particularly original in its development, and its preparation must be commensurate with the number of 4 CFU assigned to it by the Ordinance.

The grade is expressed in one hundred and ten and considers the average of the grades given in the exams + grades for the final paper + grades for career evaluation (off-plan CFU acquisition, rapidity of career -graduation by the December session of the third year-, activities carried out and certified within projects or paths activated by our University, maximum 1 point) + Erasmus (maximum 1 point).

Points for final paper: 0 insufficient; 1-2 sufficient; 3 fair; 4 good, 5 excellent, 6 excellent.

The total number of points to be added to the average may not exceed a maximum of 8 (6 + 2).

In all cases, the eventual awarding of praise is subject to the ascertained relevance of the candidate's achievements (both as an average of the grades in the exams taken, and for quality and commitment in the final paper), a score higher than 110, and the unanimous assessment of the Commission. Praise may be given even if the student has not earned praise in his or her career.

For any old master's (single-cycle) degrees, the rules of the Master's degree apply.

The final examination may also be taken in English, as may the writing of the related paper.

To be admitted to the final examination, the student must have earned 176 credits, including credits provided for foreign language proficiency.

Information regarding the final examination can be found on the University's website:

<https://www.unimi.it/studiare/frequentare-un-corso-di-laurea/laurearsi>

## **Campus**

Course locations: Department of Biosciences (via Celoria 26), Settore Didattico (via Celoria 20, via Golgi 19, via Venezian 14), Department of Earth Sciences "Ardito Desio" (via Mangiagalli 34 e via Botticelli 23) and other classrooms situated in different buildings in Milan-Città Studi.

## **Laboratories**

Laboratory locations: Department of Biosciences (via Celoria 26), Settore Didattico (via Celoria 20, via Golgi 19, via Venezian 14), Department of Earth Sciences "Ardito Desio" (via Mangiagalli 34 e via Botticelli 23).

## **Notes**

In order to obtain their degree, students are required to have a B1 level of proficiency according to the Common European Framework of Reference for Languages (CEFR). This level of proficiency can be certified as follows:

? by submitting an official language certificate at B1 level or higher, issued no more than three years before the submission date. The list of language certificates recognized by the University is available at <https://www.unimi.it/en/node/39322>.

The certificate must be uploaded during enrolment or later through the portal <http://studente.unimi.it/uploadCertificazioniLingue>.

? by taking a placement test administered by the University Language Centre (SLAM) between October and December (January for Master's degree courses) of the first year. Students who do not pass the test will be required to attend a language course offered by SLAM.

The placement test is compulsory for all students who do not already hold a valid certificate.

Students who do not take the placement test by the end of December (by the end of January for Master's degree courses), or who fail the end-of-course test after six attempts, must obtain a language certificate privately before graduating.

## **EXPERIENCE OF STUDY ABROAD AS PART OF THE TRAINING PROGRAM**

The University of Milan supports international mobility by providing its students with the opportunity to spend study and internship periods abroad. It is a unique chance to enrich your educational path in a new exciting environment.

The agreements entered into by the University with over 300 universities from the 27 EU member countries under the European Erasmus+ programme allow regularly enrolled students to carry out part of their studies at one of the partner universities or to undertake internships at companies, training and research centres and other organisations.

Similar international mobility opportunities are provided outside Europe, through agreements with a number of prestigious institutions.

The University of Milan is a member of the 4EU+ European University Alliance that brings together eight public multidisciplinary universities: University of Milan, Charles University of Prague, Heidelberg University, Paris-Panthéon-Assas University, Sorbonne University of Paris, University of Copenhagen, University of Geneva, and University of Warsaw. The 4EU+ Alliance offers integrated educational pathways and programmes to promote the international mobility of students (physical, blended and virtual).

## **Study and internships abroad**

As part of the ERASMUS+ program for study, agreements have been made with universities in several countries, including Spain, France, Denmark, the Netherlands, Germany, the Czech Republic and Romania, for students enrolled in the Bachelor of Science in Natural Sciences. The study period abroad can be used to take courses and related exams, and to conduct research activities for the purpose of the dissertation. The student admitted to the mobility program must submit a proposed study plan that includes the educational activities he or she plans to carry out abroad. The number of CFUs in the proposed plan should, as far as possible, correspond to that which the student would acquire in an equivalent period of time at his or her own university. The proposed activities, chosen within the framework of the educational activities of the host University,

should be consistent with the educational project of the Degree Course. The proposed plan must be submitted to the Erasmus Commission of the Interdepartmental Teaching College for approval. The Commission may ask the student, where deficiencies are found in core courses, to supplement the syllabus of an examination taken at the host university with a colloquium to be conducted at his or her own university on an agreed supplementary syllabus.

### How to participate in Erasmus mobility programs

How to participate in Erasmus+ mobility programmes

The students of the University of Milan can participate in mobility programmes, through a public selection procedure.

Ad hoc commissions will evaluate:

- Academic career
- the candidate's proposed study programme abroad
- his/her foreign language proficiency
- the reasons behind his/her application

Call for applications and informative meetings

The public selection for Erasmus+ mobility for study generally begins around February each year with the publication of a call for applications specifying destinations and requirements. Regarding the Erasmus+ Mobility for Traineeship, the University of Milan usually publishes two calls a year enabling students to choose a destination defined by an inter-institutional agreement or to find a traineeship position on their own.

The University organises informative meetings to illustrate mobility opportunities and rules for participation.

Erasmus+ scholarship

The European Union grants the winners of the Erasmus+ programme selection a scholarship to contribute to their mobility costs, which may be supplemented by the University funding for disadvantaged students.

Language courses

Students who pass the selections for mobility programmes can benefit from intensive foreign language courses offered each year by the University Language Centre (SLAM).

<https://www.unimi.it/en/node/8/>

Learn more at <https://www.unimi.it/en/node/274/>

For assistance, please contact:

International Mobility Office

Via Santa Sofia 9 (second floor)

Tel. 02 503 13501-12589-13495-13502

Contacts: InformaStudenti;

Student Desk booking through InformaStudenti

<b>1st COURSE YEAR Core/compulsory courses/activities common</b>		
<b>Learning activity</b>	<b>Ects</b>	<b>Sector</b>
Botany	12	(6) BIOS-01/B, (6) BIOS-01/A
Chemistry	10	(6) CHEM-05/A, (4) CHEM-03/A
English assessment B1 (2 ECTS)	2	NN
Fundamental of mathematics and statistics	12	(8) MATH-01/B, (4) MATH-03/B
General and environmental biology with elements of Histology	8	BIOS-04/A
Physical geography and cartography	8	GEOS-03/A
Physics	6	(2) PHYS-03/A, (2) PHYS-01/A, (2) PHYS-06/A
Zoology	12	BIOS-03/A
Total compulsory credits		70
<b>2nd COURSE YEAR (available as of academic year 2027/28) Core/compulsory courses/activities common</b>		
<b>Learning activity</b>	<b>Ects</b>	<b>Sector</b>
Comparative anatomy	7	(4) BIOS-04/A, (3) BIOS-12/A
Ecology and behavioural ecology	15	BIOS-05/A
General and environmental physiology	8	BIOS-06/A
Genetics	8	BIOS-14/A
Geology	6	GEOS-02/B
Mineralogy	6	GEOS-01/A

Paleontology	6	GEOS-02/A
Petrography	6	GEOS-01/B
Total compulsory credits		62
<b>3rd COURSE YEAR (available as of academic year 2028/29) Core/compulsory courses/activities common</b>		
<b>Learning activity</b>	<b>Ects</b>	<b>Sector</b>
Evolutionary biology	6	(1) BIOS-03/A, (2) BIOS-15/A, (2) BIOS-14/A, (1) BIOS-01/B
Geographic Information Systems	6	INFO-01/A
Total compulsory credits		12
<b>Elective courses</b>		
<b>The student must acquire 12 CFUs by choosing from the courses listed below. The only rule to be observed is that no more than one course in the area of Ecological Disciplines (sectors BIO/03, BIO/07 and GEO/04)</b>		
Analysis of biological and environmental	6	BIOS-03/A
Anthropology and archaeological excavation	6	BIOS-03/B
Biodiversity conservation	6	BIOS-05/A
Climatology	6	GEOS-03/A
Developmental biology	6	(3) BIOS-04/A, (3) BIOS-01/A
Environmental microbiology	6	BIOS-15/A
Freshwater biology	6	BIOS-03/A
General entomology	6	AGRI-05/A
Geobotany	6	BIOS-01/B
Geomorphology	6	GEOS-03/A
Geopedology	6	GEOS-03/A
Mineral resources and environmental interactions	6	GEOS-01/D
Molecular biology and evolution of genomes	6	(4) BIOS-08/A, (2) BIOS-15/A
Paleontology heritage and excavations	6	GEOS-02/A
Plant physiology	6	BIOS-02/A
Quaternary climate changes	6	GEOS-02/B
Vascular plants	6	BIOS-01/B
Vertebrate zoology	6	BIOS-03/A
Volcanology	6	(3) GEOS-01/C, (3) GEOS-01/B
<b>The student must autonomously acquire 12 cfu from all the courses activated by the University (preferably chosen within the scientific area), as long as they are coherent with the training project, subject to assessment by his/her tutor and approval by the relevant commission. The above-mentioned courses also count as part of this choice (in this case, tutor and commission approval is not required). This category also includes any courses identified as part of the "Transversal University Competences" indicated in the resolution (see the paragraph "Course structure &gt; Presentation of the study plan").</b>		
<b>COURSE YEAR UNDEFINED Core/compulsory courses/activities common</b>		
<b>Learning activity</b>	<b>Ects</b>	<b>Sector</b>
Field activity, training activity and laboratories	8	NN
Total compulsory credits		8
<b>End of course requirements</b>		
Final exam	4	NN
Total compulsory credits		4

### **COURSE PROGRESSION REQUIREMENTS**

*The course contains the following obligatory or advised prerequisites*

Learning activity	Prescribed foundation courses	O/S
Petrography	Mineralogy	Core/compulsory