



# UNIVERSITÀ DEGLI STUDI DI PALERMO

**Department: Earth and sea sciences**

**A.Y. 2020/2021**

## **DEGREE COURSE IN NATURAL AND ENVIRONMENTAL SCIENCE - NATURAL SCIENCES -**

### **Educational objectives**

The educational programme of the degree course has been designed in coherence with the qualifying training objectives of Class L-32 and aims at providing the scientific and methodological bases to obtain a solid knowledge for a systemic approach to the world of nature, seen in its biotic and abiotic components, in their relations, and in their historical development. The degree program provides two educational paths, the first of which aimed at developing skills in the natural sciences sector, especially through the deepening of the "biological disciplines", and the second providing knowledge and skills in the field of environmental sciences through the deepening of the "agricultural, chemical, physical, juridical, economic and contextual disciplines". This possibility of deepening the two different thematic aspects justifies the wide range of credits in the areas of "Biological Disciplines" and "Agricultural, Chemical, Physical, Legal, Economic and Contextual Disciplines".

Therefore, the formulation of the educational proposal entails the possibility of introducing further scientific-disciplinary sectors for class-specific activities, to provide a broader training offer that takes into account, above all, the right balance between the disciplines belonging to the biological sciences and earth sciences sectors. In the implementation of the cultural project it was decided to ensure a wide degree of freedom to the possibility of activating teachings in the sectors mentioned above, which are strategic to the degree project. This led to a wide range of credits for the basic and characterizing training activities, which may allow, in the preparation of the course syllabus, a more adequate adherence to the expected learning outcomes and to the available resources. The course includes from 39 to 66 credits for basic activities, to provide students with the solid scientific knowledge on which to set the specific study. The class specific activities are awarded with 54 to 102 CFU, with a substantial balance between the chemical, biological, ecological and Earth sciences disciplines, the cultural areas for graduates of this course, and a space for other disciplines completing the specific cultural training. The wide range of related and supplementary disciplines (from 18 to 30 CFU), integrates the acquired skills, even emphasizing disciplines already included among the class specific ones, for the specificity of the educational offer and of the relevant territorial context.

Finally, ample space is dedicated to other training activities (from 27 to 39 CFU), such as multidisciplinary excursions, internships, traineeships and other activities oriented towards entering the labour market, as well as stays at other Italian and European universities, under international agreements. In order to achieve the learning outcomes, the educational programme provides a good knowledge of the foundations of mathematics, physics and chemistry, also through the acquisition of the relevant basic languages. This basic knowledge will allow to address, through the application of the scientific method: the study of the forms, phenomena and processes of animal and plant organisms, also at an evolutionary level; knowledge of the Earth system, through the study of endogenous and exogenous processes; the understanding of the interdisciplinary aspects of studies on nature and the environment. Through exercises, laboratories and internship activities, students will acquire the ability to collect, analyse and process field and laboratory data; to learn experimental protocols and procedures, to apply and communicate them; to acquire the ability to apply appropriate safety and prevention measures in the laboratory and in the field.

Graduates of this course will therefore have acquired the scientific and methodological foundations enabling them to carry out professional activities, at an intermediate level of responsibility, in the various fields of natural and environmental sciences as support for the activities of control, management, recovery and planning of natural and anthropized environmental systems, as well as for activities of dissemination and scientific communication; they will also be able to effectively use, in written and oral form, at least one European Union language, within the specific area of competence

### **Professional opportunities**

Profile:

Collaborator in the monitoring and conservation of environmental systems

Functions:

They take care of detecting measures and applying methodologies aimed at improving environmental quality; collaborate in the management of environmental requalification, monitoring and control.

Skills:

Collaboration in the management and implementation of environmental impact studies, strategic assessment and environmental risk; knowledge and ability to use methods and techniques of investigation on the territory and techniques of

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analysis of experimental data.

Professional opportunities:

Central Public Administrations, such as the Ministries of the Environment, Health, Cultural Heritage, Infrastructures, University and Scientific and Technological Research; Local administrations such as Regions, Provinces, Municipalities and Regional Environment Protection Agencies; Private companies

Profile:

Collaborator in the field of definition, implementation and management of integrated programs and projects of urban, territorial and environmental transformation and regeneration

Functions:

They deal with detecting measures and applying environmental pollution methodologies in the sampling and analysis phases, using an appropriate instrumentation;

Collaboration in the management of studies of strategic and environmental risk assessment; monitoring compliance with regulations concerning environmental protection and prevention of environmental damage

Skills:

Ability to use local information systems; ability to survey and illustrate information on the field and in the laboratory, aimed at evaluating safety and environmental protection; ability to use tools for prevention, de-pollution and reclamation, for the protection of man and the environment

Professional opportunities:

Central Public Administrations, such as the Ministries of the Environment, Health, Cultural Heritage, Infrastructures, University and Scientific and Technological Research; Local administrations such as Regions, Provinces, Municipalities and Regional Environment Protection Agencies; Private companies

Profile:

Organizational manager for naturalistic tourism

Functions:

Promotion of naturalistic tourism initiatives; collaboration in landscape planning and conservation.

Support to the implementation of environmental education and communication programs and projects;

Assistance in the study and drafting of naturalistic spatial plans with the relevant definition of the areas of tourist and environmental interest;

Skills:

Knowledge of the processes and mechanisms by which organisms and the Earth system function and interact, seen in an historical-evolutionary context. Ability to manage interdisciplinary skills and systemic nature culture aimed at naturalistic tourism.

Ability to represent and apply the systemic culture of environment to the correct application in tourism both natural and modified by human beings.

Professional opportunities:

institutions, cooperatives and other organizations operating in the field of naturalistic tourism; - national and regional agencies for the protection of the environment; - public bodies (Ministries, Regions, Provinces, Municipalities);

- local authorities, consortiums and non-economic public bodies for the management of parks and protected areas; - scientific museums and botanical gardens; - educational institutions

Profile:

Educator and naturalist/environmental communicator

Functions:

Promotion of naturalistic tourism initiatives; collaboration in landscape planning and conservation.

Support to the implementation of environmental education and communication programs and projects; assistance in the study and drafting of naturalistic spatial plans with the relevant definition of the areas of tourist and environmental interest;

Skills:

Knowledge of the processes and mechanisms by which organisms and the Earth system function and interact, seen in an historical-evolutionary context. Ability to manage interdisciplinary skills and systemic nature culture aimed at naturalistic tourism.

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### **Final examination features**

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To obtain the degree, students must have acquired 180 credits including those relating to the final examination (3 credits). The final test has the objective of assessing the level of maturity and critical skills of the undergraduate, with respect to learning and to the acquired knowledge, on completion of the activities provided by the course syllabus.

Subjects 1 ° year	CFU	Per	V\W	SSD	TAF
04872 - MATHEMATICS <i>Lombardo(PO)</i>	9	1	V \ 1	MAT/07	A
18787 - PHYSICAL GEOGRAPHY <i>Rotigliano(PO)</i>	6	1	V \ 1	GEO/04	A
03245 - PHYSICS <i>Argiroffi(RU)</i>	6	1	V \ 1	FIS/05	A
01690 - BOTANY - INTEGRATED COURSE	12	2	V \ 1		
- GENERAL BOTANY <i>Tomasello(PA)</i>	6	2		BIO/03	C
- SYSTEMATIC BOTANY	6	2		BIO/02	B
01597 - CELL BIOLOGY <i>Santulli(RU)</i>	6	2	V \ 1	BIO/06	B
19286 - PRINCIPLES OF CHEMISTRY FOR NATURE AND ENVIRONMENT <i>Maccotta(RU)</i>	6	2	V \ 1	CHIM/12	B

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Subjects 2 ° year	CFU	Per	V\W	SSD	TAF
19859 - GEOLOGY AND GEOCHEMISTRY - INTEGRATED COURSE	12	1	V \ 1		
- GEOCHEMISTRY <i>Parello(PO)</i>	6	2		GEO/08	B
- GEOLOGY <i>Agate(PA)</i>	6	2		GEO/02	B
19860 - MINERALOGY AND PETROGRAPHY - INTEGRATED COURSE	12	1	V \ 1		
- MINERALOGY <i>Sciascia(PA)</i>	6	1		GEO/06	B
- PETROGRAPHY <i>Scopelliti(RU)</i>	6	1		GEO/07	B
01933 - ORGANIC CHEMISTRY <i>Riela(PA)</i>	6	1	V \ 1	CHIM/06	A
07744 - ZOOLOGY - INTEGRATED COURSE	12	1	V \ 1		
- GENERAL ZOOLOGY <i>Cammarata(PO)</i>	6	1		BIO/05	A
- SYSTEMATIC ZOOLOGY <i>Parisi(PA)</i>	6	1		BIO/05	C
02679 - ECOLOGY - INTEGRATED COURSE	12	2	V \ 1		
- EXPERIMENTAL ECOLOGY <i>Milazzo(PO)</i>	6	2		BIO/07	B
- GENERAL ECOLOGY <i>Chemello(PA)</i>	6	2		BIO/07	B
18030 - GENETICS AND MICROBIOLOGY - INTEGRATED COURSE	9	2	V \ 1		
- GENETICS <i>Corona(PA)</i>	6	2		BIO/18	C
- MICROBIOLOGY <i>Quatrini(PA)</i>	3	2		BIO/19	C

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Subjects 3 ° year	CFU	Per	V\W	SSD	TAF
16159 - ANALYTICAL CHEMISTRY <i>Piazzese(PA)</i>	6	1	V \ 1	CHIM/01	A
16172 - ANTHROPOLOGY <i>Sineo(PO)</i>	6	1	V \ 1	BIO/08	B

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Subjects 3 ° year	CFU	Per	V\W	SSD	TAF
03690 - GEOMORPHOLOGY <i>Conoscenti(PA)</i>	6	1	V \ 1	GEO/04	A
01636 - MARINE BIOLOGY <i>Vizzini(PO)</i>	6	1	V \ 1	BIO/07	B
03040 - EDUCATIONAL TRIPS	3	1	G \ 0		F
20692 - ENGLISH LANGUAGE SKILLS - EQUIVALENT TO LEVEL B1	6	1	G \ 0		E
18182 - INTERNSHIP AND PRACTICE	6	1	G \ 0		S
05505 - PALAEOONTOLOGY	6	2	V \ 1	GEO/01	B
19857 - PHYSIOLOGY AND COMPARATIVE ANATOMY - INTEGRATED COURSE	12	2	V \ 1		
- <i>COMPARATIVE ANATOMY</i> <i>Vazzana(PA)</i>	6	2		BIO/06	B
- <i>PHYSIOLOGY</i> <i>Zizzo(PA)</i>	6	2		BIO/09	B
05917 - FINAL EXAMINATION	3	2	V \ 1		E
Free subjects	12				D
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## PROPAEDEUTICAL TEACHINGS

01933 - ORGANIC CHEMISTRY

19286 - PRINCIPLES OF CHEMISTRY FOR NATURE AND ENVIRONMENT