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ANNEX A

PhD Course Biology and Applied Science (DOT197K79Z)

Coordinator	Prof. Filippo Santucci de Magistris e-mail: filippo.santucci@unimol.it	
CUN Area	Area – 01 - Mathematics and Informatics; Area – 03 – Chemistry; Area – 05 – Biology; Area 08 - Civil Engineering and Architecture; Area – 09 - Industrial and Information Engineering; Area – 13 - Economics and Statistics	
E.R.C.	PE1 - PE4 - PE5 - PE6 - PE8 - LS1 - LS2 - LS3 - LS4 - LS8 – LS9 – SH1	
Overview	The course aims to prepare highly qualified intersectoral scientific researchers in the field of biology and technologies related to the security of civil structures and infrastructures, security of the information, data analysis, and the processing of information. It is divided into two <i>curricula</i> : Biology and Applied Sciences.	
Website	Information on the articulation of the activities of the PhD is available on the web page of the PhD Course https://dipbioter.unimol.it/bsa-xxxix/	
Duration	01/11/2023 – 31/10/2026	
Available positions	Positions with scholarships	2
	Position with a scholarship DM 118/2023 digital and environmental transitions (M4C1 - Inv. 3.4) Theme: Design and analysis of cryptographic primitives for access control on encrypted data -Period in Italy of n. 6 months at: an institution to be defined -Period abroad of n. 6 months at: Newcastle University	1
	Position with a scholarship DM 118/2023 PNRR (M4C1-Inv. 4.1) Theme: Investigating molecular mechanisms of neurodegeneration to identify novel therapeutic targets for brain diseases -Period in Italy of n. 6 months at: Fondazione Santa Lucia -Period abroad of n. 6 months at: Erasmus University Medical Center, Rotterdam	1
	Position with a scholarship DM 118/2023 PNRR (M4C1-Inv. 4.1) Theme: Design and validation of sustainable and safe engineering solutions for Inner Areas regeneration and development -Period in Italy of n. 6 months at: National Research Council - Institute for Construction and Technology, ITC-CNR, L'Aquila; S2X s.r.l., Campobasso, Italy; Municipality of Civitacampomarano, Campobasso, Italy -Period abroad of n. 6 months at: Institute for Sustainability and Innovation in Structural Engineering at University of Minho, Gumaraes, Portugal	1
	Position with a scholarship DM 117/2023 Theme: Extended Reality and its industrial application in the fields of security and maintenance with particular reference to real-time monitoring of sensor networks (IoT) -Period in Italy of n. 6 months at Enterprise: IT Centric s.r.l. -Period abroad of n. 6 months at: an institution to be defined	1





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	TOTAL Positions with scholarship	6
	of which with scholarship reserved for applicants from foreign universities	1
	Positions without scholarships	1
Requirements for admission to the competition	All specialized or master's degrees or degrees in the system before the introduction of the D.M. 509/1999. For candidates who have acquired the title abroad, the latter must have characteristics equivalent to those indicated above.	
Assessable qualifications and related score	<p>List of assessable qualifications (score up to a maximum of 25/100):</p> <ul style="list-style-type: none"> - <i>curriculum vitae et studiorum</i>; - graduation mark; in the case of participation in the selection before graduation, the weighted average marks of the passed exams; - other educational qualifications which can be deduced from the curriculum vitae et studiorum: specialization diplomas; attendance of post-graduate specialization courses; documented research activity at universities and research centers; prizes and awards obtained during the study; participation in Erasmus programs; internship and abroad activities; work experiences, internships and training in companies; I and II level masters; research grants - maximum of three peer-reviewed scientific publications and a maximum of five participations in national and international conferences with written contributions, oral presentations, or posters. 	
<p>In the evaluation of applications for scholarships financed with the resources referred to in Ministerial Decree 118/2023 and with particular reference to the project proposal presented by the candidates, the Commissions will also take into account the criteria set out in Ministerial Decree 118/2023</p>		
<p>In the evaluation of applications for scholarships financed with the resources referred to in Ministerial Decree 117/2023 and with particular reference to the project proposal presented by the candidates, the Commissions will also take into account the criteria set out in Ministerial Decree 117/2023.</p>		
Thematic areas of the research project proposals and of the interview	<p>Research proposal (score up to a maximum of 25/100):</p> <p>Candidates are required to prepare a research proposal, according to the template (see annex n°5) to be submitted along with the application.</p> <p>The project proposal, consistent with its own second-level degree, must be written by selecting one of the following topics:</p> <p>Curriculum Biology:</p> <ul style="list-style-type: none"> - Recovery, conservation, monitoring and characterization of plant biodiversity; - Study of the mechanisms of interaction between plant organisms and the environment; - Use of plants and microorganisms in environmental recovery and remediation; - Analysis of microbial communities and study of the interaction between microorganisms and between microorganisms and higher organisms; - Study of the cellular and molecular mechanisms underlying tumor pathology; - Analysis of the response of healthy or pathological human cellular models to treatment with molecules of natural and/or synthetic origin; - Regulation of metabolic pathways in the processes of cell proliferation, survival and differentiation; - Identification and characterization of bioactive secondary metabolites from natural sources, design, synthesis and evaluation of derivatives. <p>Curriculum Applied Sciences:</p> <ul style="list-style-type: none"> - Design and development of complex and secure software systems; - Design of decision support systems based on machine learning techniques and optimization methods both exact and based on meta-heuristics; - Analysis and design of mathematical models for the analysis of images and for the modeling and numerical solution of systems of complex equations; 	
<p><i>Please note that the project proposal illustrated in the report, prepared for competition, is not necessarily the project that will be carried out during the PhD program. If admitted, the research project that will be carried out will be subsequently defined and approved by the Program Faculty Board after the start of the PhD Program.</i></p>		



	<ul style="list-style-type: none"> - Diagnostics, monitoring or experimentation (people or environment and territory or structures and infrastructures); - Security of IT and technological infrastructures; - Analysis, refurbishment, and preservation of the relevant environmental, urban, historical and architectural heritage; - Structural or geotechnical safety of structures or infrastructures; - Use of advanced numerical analysis or artificial intelligence for the study of structures and infrastructures or the use of new or recycled materials in civil engineering. <p>Alternatively, candidates can submit their project proposals by choosing one of the following topics:</p> <ul style="list-style-type: none"> - Design and analysis of cryptographic primitives for access control on encrypted data <p>DM 118/2023 digital and environmental transitions (M4C1 - Inv. 3.4)</p> <ul style="list-style-type: none"> - Investigating molecular mechanisms of neurodegeneration to identify novel therapeutic targets for brain diseases <p>DM 118/2023 PNRR (M4C1-Inv. 4.1)</p> <ul style="list-style-type: none"> - Design and validation of sustainable and safe engineering solutions for Inner Areas regeneration and development <p>DM 118/2023 PNRR (M4C1-Inv. 4.1)</p> <ul style="list-style-type: none"> - Extended Reality and its industrial application in the fields of security and maintenance with particular reference to real-time monitoring of sensor networks (IoT) <p>D.M. 117/2023</p> <p>Interview</p> <p>The oral exam and interview (score up to a maximum of 50/100) will consist of an oral presentation of the research proposal and a discussion of the technical and scientific issues related to it. Knowledge of the English language was also evaluated. Candidates can conduct presentations and discussions in either Italian or English.</p>
<p>Assessment criteria and ranking of the candidates</p>	<p>The evaluation of the qualifications and the project proposal is required for admission to the oral exam. The results of the first evaluation phase will be published, as soon as they are available, on the University's website at https://www2.unimol.it/dottorato/.</p> <p>To be admitted to the oral exam, the candidate must score not less than 15/100 on the evaluation of their research proposal.</p> <p>The maximum score is equal to 100/100, divided into the following sub-scores:</p> <ul style="list-style-type: none"> • 25/100 Academic qualifications; • 25/100 Research proposal in written form; <ul style="list-style-type: none"> o Consistency of the project proposal with the themes indicated o Originality of the project and the contribution to knowledge in the area o Clarity in the identification and description of the research objectives o Project structure and feasibility o Organization and synthesis • 50/100 Interview and knowledge of the English language. <ul style="list-style-type: none"> o Clarity and mastery of knowledge in the area of the project - state of the art



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	<ul style="list-style-type: none">o Clarity of the candidate to expose and describe the objectives, originality, expected results, contribution to the knowledge of the area and any practical application of the proposed researcho Candidate's ability to discuss the structure of the project, including methodso Aptitude to the research activity <p>The results of the two evaluation phases will be published, as soon as available on the website https://www.unimol.it/https-www-unimol-it-ricerca/dottorati-di-ricerca-2.</p>
Merit ranking	Candidates with an overall score of at least 50/100 points will be included in the overall merit ranking.
Interview calendar	<p>Date: September 11, 2023 at 10:30 a.m. (Italian Time); the schedule of the interviews will be defined by the Selection Committee depending on the number of candidates admitted to the oral exam.</p> <p>Place:</p> <p>In person: Department of Bioscience and Territory, University of Molise, Contrada Fonte Lappone, 86090 Pesche (IS), Italy.</p> <p>or</p> <p>- online: Google <i>Meet</i> at: https://meet.google.com/gbh-cetz-dqn +1 262-563-8856 PIN: 971 286 092#</p>

