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UNIVERSITÀ DEGLI STUDI DEL MOLISE

ANNEX A

PhD Course in Biology and Applied Science (DOT197K79Z)

Coordinator	Dr. 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 at preparing 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 *curricula*: Biology and Applied Sciences.	
Website	http://dipbioter.unimol.it/dottoratobeat/	
Duration	01/11/2022 – 31/10/2025	
Available positions	Positions with scholarships Term abroad from 3 to 12 months at an institution to be defined	**3**
	Positions with scholarships **DM 351/2022** (PNRR (M4C1-Inv. 4.1)) *Topic:* The role of autophagy in the onset and progression of glioblastoma Term abroad of 6 months at an institution to be defined	**1**
	Positions with scholarships **DM 351/2022** (PNRR (M4C1-Inv. 4.1)) *Topic:* Evaluation, characterization, and enhancement of the cultivars of the Apennine inland areas for the identification of new bioactive molecules and development of nutraceuticals, cosmeceuticals, food supplements and cosmetics Term abroad of 6 months at an institution to be defined	**1**
	Positions with scholarships **DM 352/2022** *Topic:* Artificial intelligence for monitoring and evaluating the security of critical software systems Research term from 6 to 18 months at Datasound Term abroad of 6 months at an institution to be defined	**1**
	Positions with scholarships **DM 352/2022** *Topic:* Artificial intelligence and virtual reality to improve the customer experience Research term from 6 to 18 months at Amarena company s.r.l. Term abroad of 6 months at an institution to be defined	**1**
	Positions with scholarships **DM 352/2022** *Topic:* Hyperautomation scenarios in the Metaverse Research term from 6 to 18 months at Key Partner s.r.l. Term abroad of 6 months at an institution to be defined	**1**
	Positions with scholarships **DM 352/2022** *Topic:* Study of the biological effects induced by novel compounds with anti-angiogenic activity Research term from 6 to 18 months at Dompé farmaceutici s.p.a. Term abroad of 6 months at an institution to be defined	**1**

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	Positions with scholarships **DM 352/2022** *Topic:* Automotive safety: technologies and legal implications Research term from 6 to 18 months at DR automotive s.p.a Term abroad of 6 months at an institution to be defined	**1**
	Positions with scholarships **DM 352/2022** *Topic:* Data-driven procedures for structural monitoring of civil engineering infrastructures of the road network Research term from 6 to 18 months at Almaviva s.p.a. Term abroad of 6 months at an institution to be defined	**1**
	Positions with scholarships **DM 352/2022** *Topic:* Extended Reality and its industrial application in the fields of security and maintenance with particular reference to real-time monitoring of sensor networks (IoT) Research term from 6 to 18 months at IT Centric s.r.l. Term abroad of 6 months at an institution to be defined	**1**
	Positions with scholarships **DM 352/2022** *Topic:* Management and maintenance, in a digital environment, of industrial structures and infrastructures Research term from 6 to 18 months at Centria s.r.l. Term abroad of 6 months at an institution to be defined	**1**
	TOTAL Positions with scholarships	**13**
	of which with scholarships 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 of the system before that introduced with the D.M. 509/1999. For candidates who have acquired the title abroad, the latter must have equivalent characteristics of a second-level degree to those indicated above.	
Assessable qualifications and related score	**List of assessable qualifications (score up to a maximum of 25/100):** - *curriculum vitae et studiorum*; - 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.	
Thematic areas of the research project proposals and the interview *Please note that the project proposal illustrated in the report, (annex 5), prepared for the competition, is not necessarily the project that will be carried out during the*	**Research proposal (**score up to a maximum of **25/100**): Candidates are required to prepare a research proposal, according to the template (see annex n°5) to be submitted along with the application. The project proposal, coherent with its own second-level degree, must be written by selecting one of the following topics:	

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PhD program. If admitted, the research project that will in fact be carried out will be subsequently defined and approved by the Program Faculty Board after the start of the PhD Program.	Curriculum Biology: - 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. Curriculum Applied Sciences: - 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; - 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 material in civil engineering. Alternatively, candidates can also submit their project proposal by choosing one of the following topics: - The role of autophagy in the onset and progression of glioblastoma DM 351/2022 (PNRR (M4C1-Inv. 4.1) - Evaluation, characterization and enhancement of the cultivars of the Apennine inland areas for the identification of new bioactive molecules and development of nutraceuticals, cosmeceuticals, food supplements and cosmetics DM 351/2022 (PNRR (M4C1-Inv. 4.1) - Artificial intelligence for monitoring and evaluating the security of critical software systems (D.M. 352/2022) - Artificial intelligence and virtual reality to improve the customer experience (D.M. 352/2022) - Hyperautomation scenarios in the Metaverse (D.M. 352/2022) - Study of the biological effects induced by novel compounds with anti-angiogenic activity (D.M. 352/2022) - Automotive safety: technologies and legal implications (D.M. 352/2022) - Data-driven procedures for the structural monitoring of works of art of the road network (D.M. 352/2022)

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	- Extended Reality and its industrial application in the fields of security and maintenance with particular reference to real-time monitoring of sensor networks (IoT) (D.M. 352/2022) - Management and maintenance, in a digital environment, of industrial structures and infrastructures (D.M. 352/2022) The research proposal may encompass graphic elements and could be divided into paragraphs containing a summary, the state of the art, the objectives, the methodology, the techniques and the related technological resources, a temporal framework of the different research phases, the expected objectives and their impact in the reference scientific area. **Interview** The oral exam and interview (score up to a maximum of **50/100**) will consist of the oral presentation of the research proposal and a discussion of the technical and scientific issues related to it. Knowledge of the English language will also be evaluated. Candidates can carry out the presentation and discussion either in Italian or in English.

Assessment criteria and ranking of the candidates	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/.
	
	To be admitted to the oral exam, the candidate must score not less than **15/100** in the evaluation of their research proposal.
	
	The maximum score is equal to **100/100**, divided into the following sub-scores:
	
	- **25/100 Academic qualifications;**
	- **25/100 Research proposal in written form;**
	
	   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.**
	
	   o Clarity and mastery of knowledge in the area of the project - state of the art
	   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 research
	   o Candidate's ability to discuss the structure of the project, including methods
	   o Aptitude to the research activity
	
	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.

Merit ranking	Candidates with an overall score of at least 50/100 points will be included in the overall merit ranking.
Interview calendar	Date: **September 5th, 2022 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. Place: **In presence:** Department of Bioscience and Territory, University of Molise, Contrada Fonte Lappone, 86090 Pesche (IS), Italy. or - **online**: Google *Meet* at: https://meet.google.com/gbh-cetz-dqn +1 262-563-8856 PIN: 971 286 092#