



UNIVERSITÀ  
DEGLI STUDI  
DEL MOLISE

DIVISIONE RISORSE E SERVIZI  
AREA SERVIZI AGLI STUDENTI  
COORDINAMENTO SEGRETERIE STUDENTI  
SETTORE DOTTORATI DI RICERCA

### *Ph.D. Course in Biology and Applied Sciences*

<b>Coordinator</b>	Dr. Filippo Santucci de Magistris e-mail: <a href="mailto:filippo.santucci@unimol.it">filippo.santucci@unimol.it</a>	
<b>CUN Area</b>	Area – 01 - Mathematics and Informatics; Area – 03 – Chemistry; Area – 05 – Biology; Area – 06 – Medicine; Area 08 - Civil Engineering and Architecture; Area – 09 - Industrial and Information Engineering; Area 12 - Law Studies	
<b>E.R.C.</b>	PE1 - PE4 - PE5 - PE6 - PE8 - LS1 - LS2 - LS3 - LS4 - LS8 – LS9 - SH4	
<b>Overview</b>	<p>The Ph.D. Program in Biology and Applied Sciences of the University of Molise aims at training advanced scientific and technological skills able to carry out autonomous and interdisciplinary research in the field of biology and safety of infrastructure and information, developing and integrating advanced tools for analysis and processing of data. Particular attention is paid to the education of the student to develop strategies of analysis and solution of complex problems to be applied both in fundamental and applied research.</p> <p>The course is divided into two <i>curricula</i>:</p> <ul style="list-style-type: none"> <li>- <i>Biology</i>: aims at training highly qualified professionals with an interdisciplinary preparation able of designing and autonomously carrying out basic and applied research in the context of the various biological systems. The research topics concern microbial, animal and plant organisms and include their study at cellular, molecular and morpho-functional level.</li> <li>- <i>Applied Sciences</i>: aims at training professionals able to autonomously design and carry out research in scientific fields characterized by high levels of interdisciplinarity by using quantitative methods. Researches are in the field of information sciences, structural and environmental monitoring technologies by exploiting the integration of numerical analysis techniques, optimization methods, data and knowledge management, software engineering and IT security and structural and geotechnical engineering.</li> </ul> <p>Additional information on the Program is available at the Ph.D. Course website</p>	
<b>Web site</b>	<a href="http://dipbioter.unimol.it/dottoratobeat/">http://dipbioter.unimol.it/dottoratobeat/</a>	
<b>Duration</b>	01/11/2021 – 31/10/2024	
<b>Available positions</b>	Positions with scholarships	<b>5</b>
	Positions with scholarship reserved for applicants from foreign universities	<b>1</b>
	Positions without scholarships	<b>2</b>
	TOTAL	<b>8</b>
	OF WHICH WITH SCHOLARSHIP	<b>6</b>
<b>Requirements for admission to the competition</b>	<p>The degree took after a Graduate Program (Two-year higher course) already declared equipollent by competent Italian authorities or deemed equivalent for the sole purposes of the competition to a Second Level Italian specialist/master degree equivalent to those released in Italy in the following classes:</p> <p>LMG/01 Law LM2 Archaeology LM-4 Architecture and Architectural engineering LM-6 Biology LM-8 Industrial Biotechnologies LM-10 Conservation of environmental and architectural heritage LM-11 Conservation and restoration of the cultural heritage LM-18 Computer science LM-21 Biomedical engineering</p>	



	<p>LM-22 Chemical engineering  LM-23 Civil engineering  LM-24 Construction engineering  LM-26 Safety engineering  LM-31 Management engineering  LM-32 Computer systems engineering  LM-33 Mechanical engineering  LM-35 Environmental engineering  LM-43 Information technology methods for the humanities  LM-44 Mathematical modelling for engineering  LM-53 Material engineering  LM-54 Chemistry  LM-60 Natural sciences  LM-66 Computer systems safety  LM-71 Industrial chemistry  LM-82 Statistics  LM-91 Methods and techniques for the information society  2/S Archaeology  4/S (Architecture and construction engineering)  6/S (Biology)  8/S (Industrial biotechnologies)  9/S (Pharmaceutical, veterinary and medical biotechnologies)  10/S (Conservation of architectural heritage and environment)  11/S (Conservation of scientific assets and industrial civilization)  12/S (Conservation and restoration of cultural heritage)  20/S (Physics)  22/S (Law)  23/S (Computer Science)  24/S (Computer Science for humanities)  27/S (Chemical engineering)  28/S (Civil engineering)  35/S (Computer engineering)  36/S (Mechanical engineering)  38/S (Environmental engineering)  61/S (Materials science and engineering)  62/S (Chemical science)  81/S (Sciences and technologies of industrial chemistry)  82/S (Science and technology for the environment and the territory)</p> <p>The required qualification obtained outside Italy should have the characteristics of equivalence with those indicated above.</p>
<b>Assessable qualifications and related score</b>	<p><b>List of assessable qualifications</b> (score up to a maximum of <b>20/80</b>):</p> <ul style="list-style-type: none"> <li>- graduation mark; in the case of participation in the selection before graduation, the weighted average mark of the passed exams taken;</li> <li>- 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; prize and awards obtained during the study; participation in Erasmus programs; internship and abroad activities; work experience, internships and training in companies; I and II level masters; research grants</li> <li>- maximum three peer-reviewed scientific publications and a maximum of five participations in national and international conferences with written contributions, oral presentations, or posters.</li> </ul>
<b>Thematic areas of the research project proposals and of the interview</b>	<p><b>Research proposal</b> (score up to a maximum of <b>20/80</b>):</p> <p>The project proposal, dated and signed, should focus to <b>one</b> of the following themes selected among those of interest (related to each of two <i>curricula</i>):</p> <ol style="list-style-type: none"> <li>1. <i>Curriculum</i> Biology: <ol style="list-style-type: none"> <li>a. recovery, conservation, monitoring and characterization of plant biodiversity;</li> <li>b. study of the mechanisms regulating the interaction between plant organisms and the environment;</li> <li>c. use of plants and microorganisms in environmental recovery and restoration;</li> <li>d. analysis of microbial communities and study of the interaction between microorganisms and between microorganisms and higher organisms;</li> </ol> </li> </ol>



	<p>e. study of the cellular and molecular mechanisms that underlie the tumoral pathology;</p> <p>f. analysis of the response of healthy or pathological human cell models to treatment with molecules of natural and/or synthetic origin;</p> <p>g. regulation of metabolic pathways in cell proliferation, survival and differentiation processes;</p> <p>h. identification and structural elucidation of secondary metabolites from natural sources, design, synthesis and evaluation of derivatives."</p> <p>2. Curriculum Applied Sciences:</p> <p>a. design and development of complex and secure software systems;</p> <p>b. design of decision support systems based on machine learning techniques and both exact and meta-heuristic optimization methods;</p> <p>c. analysis and design of mathematical models for image analysis and modeling and numerical solution of complex equation systems;</p> <p>d. diagnostics, monitoring and testing (people, environment, structures; infrastructures);</p> <p>e. security of IT and technological infrastructures;</p> <p>f. analysis, refurbishment, and preservation of the relevant environmental, urban, historical and architectural heritage;</p> <p>g. structural and geotechnical safety;</p> <p>h. big data analytics and artificial intelligence for the monitoring of the bridges</p> <p>The research proposal may encompass graphic elements and 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.</p> <p><b>Interview</b></p> <p>The oral exam and interview (score up to a maximum of <b>40/80</b>) 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 in English.</p>
<b>Assessment criteria and ranking of the candidates</b>	<p>The assessment of academic qualifications is preparatory to the interview. The results of I evaluation phase will be published, as soon as available on the website <a href="https://www.unimol.it/https-www-unimol-it-ricerca/dottorati-di-ricerca-2">https://www.unimol.it/https-www-unimol-it-ricerca/dottorati-di-ricerca-2</a>.</p> <p><b><u>To be admitted to the oral exam, the candidate must get a score that should be not less than 20/80 (given by the sum of the evaluation of qualifications and of project proposal).</u></b></p> <p>The maximum score is equal to 80/80, divided into the following sub-scores:</p> <ul style="list-style-type: none"> <li>• <b>20/80 Academic qualifications;</b></li> <li>• <b>20/80 Research proposal in written form;</b> <ul style="list-style-type: none"> <li>o Consistency of the project proposal with the themes indicated</li> <li>o Originality of the project and the contribution to knowledge in the area</li> <li>o Clarity used to identify and describe the research objectives</li> <li>o Project structure and feasibility</li> <li>o Organization and synthesis</li> </ul> </li> <li>• <b>40/80 Interview and knowledge of English language.</b> <ul style="list-style-type: none"> <li>o Clarity and mastery of knowledge in the area of the project - state of the art</li> <li>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</li> <li>o Candidate's ability to discuss the structure of the project, including methods</li> <li>o Aptitude to the research activity</li> </ul> </li> </ul> <p>The results of the two evaluation phases will be published, as soon as available on the website <a href="https://www.unimol.it/https-www-unimol-it-ricerca/dottorati-di-ricerca-2">https://www.unimol.it/https-www-unimol-it-ricerca/dottorati-di-ricerca-2</a>.</p>
<b>Merit ranking</b>	Candidates with an overall score of at least <b>40/80</b> points will be included in the overall merit ranking.
<b>Interview calendar</b>	Date: September 8 <sup>th</sup> , 2021 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: Room Pesche; Department of Bioscience and Territory, University of Molise, Contrada Fonte Lappone, 86090 Pesche (IS), ITALY.
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