ANNEX 1/b **PhD program: ENGINEERING FOR INNOVATION AND SUSTAINABLE DEVELOPMENT** **XLI CYCLE – a.y. 2025-2026**	
Department	**Department of Engineering - Potenza**
Coordinator	Prof.ssa Aurelia SOLE e-mail: aurelia.sole@unibas.it
Duration	3 years
Web site	https://diing.unibas.it/site/home/didattica/offerta-post-laurea/articolo26000064.html
Curricula	**1. Methods and Technologies for Environmental Monitoring and Protection** **1. Analysis and prevention of natural risks (seismic and landslide risks)** **2. Industrial Engineering and Information Technologies**
Aims and topics	The IISS PhD program aims to provide the doctoral students with strong scientific basis, and to help them in developing the ability to carry out pure and applied research, as well as to contribute to the elaboration and implementation of innovative, efficient, eco-compatible and socially sustainable development models. The students will acquire special skills in one of the following areas: methods and strategies for monitoring, protection and sustainability of the environment; methods of analysis of natural hazard (in particular seismic and landslide) and risk mitigation; management of raw materials, energy systems and industrial production; territorial planning, methods and systems for the processing and transmission of information. Furthermore, they are expected to acquire transversal skills in the field of sensors, modelling and analysis of complex interacting systems and of technologies of general interest. The doctoral students are also formed to be able to operate in high education sectors, as well as to carry out highly qualified activities related to research, development and management in private companies and public institutions and entities. The three curricula include activities consistent with the objectives of the National Recovery and Resilience Plan (PNRR). **Curriculum "Methods and Technologies for Environmental Monitoring and Protection":** Topics: Sensors and sensing technologies of environmental parameters; Integration and analysis of environmental data; Modelling monitoring, protection and preservation of the environment; Development of strategies and actions for prevention and resolution of environmental problems; Energy saving and distributed micro-generation; Data processing and applications with particular reference to COPERNICUS for environmental monitoring The curriculum aims to train researchers with a high scientific qualification level able to understand, apply and develop innovation in the fields of: (a) investigation methodologies, (b) analysis and modelling of environmental problems, (c) mathematical models for the scenarios development in the territorial planning as well as in the risk analysis and prevention areas, (d) sensors and also (e) the adoption and development of interventions strategies aimed at their prevention, mitigation and resolution. Moreover, attention is paid to the economic aspects of sustainable development issues, mainly concerning both social and environmental reporting themes, also in the form of integrated reports as well as the management and policy of the agri-food system. A further focus deals with the theme of the sustainable business model, from both the public and private sector perspective. **Curriculum "Analysis and prevention of natural risks (seismic and landslide risks"):** Topics: Numerical and experimental approaches for the assessment of seismic vulnerability of structures; Methods and techniques for the mitigation and management of seismic risk; Theoretical and experimental analyses of geotechnical problems; Slope stability and landslide risk reduction; Non-linear analysis of structures; Data processing and applications with particular reference to COPERNICUS for environmental monitoring. The curriculum aims to provide the doctoral students with the skills for operating in the fields of seismic and hydrogeological risks (for the latter, in particular, landslide risk), structural engineering, and geotechnical engineering. Strong physical-mathematical basis and knowledge of fundamental seismology are required. The students are supposed to

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<tr><td></td><td colspan="3">acquire deep knowledge of: structural engineering, seismic engineering, geotechnical and foundation engineering, slope stability, al the types of monitoring systems, evaluation and mitigation of landslide and seismic risks (from the single construction or single slope scale to large areas scale). Within these subjects, original and innovative research must be developed, possibly in the view of green and sustainable solutions.

Curriculum “Industrial Engineering and Information Technologies”:
Topics: Mechanical engineering design and applied mechanics, Mechanical technologies and industrial plants, Energy conversion systems, Engineering Thermodynamics and fluid flow machinery, Electromagnetism, Devices and systems for telecommunications, Automation and Mechatronics, Applied Physics.
The research project aims to train valuable researchers that are capable of proposing innovative approaches and strategies for the development of efficient and sustainable energy, propulsion and industrial production systems, as well as developing methodologies and technologies suitable to create and integrate highly complex interacting systems. Particular attention is paid to the generation and management of energy provided from alternative and conventional sources with innovative approaches and methodologies, to the design of propulsion systems and, more generally, to the problems of driving and operating machines. From the point of view of industrial production, the topics are focused on robotics, sensors, unconventional technologies for processing materials, on methods of experimental characterization of materials and mechanical structures, on the design and management of integrated production systems and of the related plants, on logistics, on the design of mechanical systems with innovative approaches also based on vibratory and tribological phenomena. From the point of view of information technologies, the topics are focused on the applications of electromagnetism and propagation, on autonomous systems, on electronics for biometric applications and on telecommunication systems.</td></tr>
<tr><td>Admission requirements</td><td colspan="3">a) University degree obtained under the previous educational systems (ex ante D.M. 509/99, whose legal course has at least a four-year term);
b) Laurea specialistica/magistrale (D.M. 509/99 and Dm 270/2004);
c) Academic title obtained abroad and eligible for access to the PhD program, previously recognized by academic authorities, even in the context of inter-university cooperation and mobility agreements. In the absence of such approval, the candidate must apply a request in the application form according to the Art. 3 of this call.</td></tr>
<tr><td rowspan="2">Available positions</td><td rowspan="2">16</td><td>With scholarship</td><td>Without scholarship</td></tr>
<tr><td>15</td><td>1</td></tr>
<tr><td>Type of scholarships
(Description awarding entity and research topic)</td><td>Regione Basilicata
“Programma regionale Basilicata FESR FSE+ 2021-2027”

Patti territoriali “D.D. MUR 5 febbraio 2025, n. 112”</td><td colspan="2"><u>9 scholarships</u> on the following topics:

1) “Zero-carbon fuels for sustainable machinery, energy and propulsion systems”.

2) “Monitoring and Assessment of hydraulic risk of road infrastructures”

3) “Design and development of automated tools for tasks in harsh environments”

4) “Sustainability of water and wastewater treatment and control of emerging contaminant”

5) “Bioconversion of organic waste into energy and fertilizers”.

6) “Novel Indices for monitoring vegetation and crop stress”

7) “Advanced Satellite Remote Sensing Techniques for Natural Hazards Monitoring and Mitigation”

8) “Theoretical and numerical treatment of differential models with environmental applications”</td></tr>
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		9) "The satellite mission LUCE and the development of algorithms for the determination of climate-related geophysical variables" 10) "AI based Sustainability Enlargement in Closed Loop Supply Chain" A period in a company (6 months) and abroad (12 months) is mandatory.	
	CNR-IMAA	**<u>1 scholarship</u>** Topic: "Study of atmospheric parameters of climatic interest through high-quality and harmonized observations in the framework of European Research Infrastructures" A period in CNR-IMAA and abroad is mandatory.	
	ENEA	**<u>1 scholarship</u>** Topic: "Gasification of solid biomass for the production of hydrogen-enriched syngas and for applications in high-efficiency cogeneration (CHP) systems using SOFCs" A period in ENEA and abroad is mandatory.	
	DIING-RSE	**<u>1 scholarship</u>** Topic: "Methodologies for assessing the increase in hydrological-hydraulic hazards due to climate change and resulting disruptions to the electrical system" A period in RSE and abroad is mandatory.	
	DIING Progetto LUCAS	**<u>2 scholarships</u> on the following topics:** 1) "Protocols for sampling and health-environmental risk assessment in complex areas of the Basilicata region" 2) "Development of numerical models to study the diffusion of pollutants in the air in Basilicata" A period abroad is mandatory.	
	DIING	**<u>1 scholarship</u>** Topic: "Possible triggers of slow-moving landslides in clayey soils: experimentation and modelling" A period abroad is mandatory.	
Positions reserved for graduates in foreign universities		**With scholarship**	**Without scholarship**
		0	**0**

Positions without scholarship	**1** A period abroad is mandatory.	
Admission procedure	The admission procedure is conducted through the: **a) evaluation of qualifications** **b) evaluation, as part of the interview, of a research project**, drawn up in Italian or English using the format set out in **Annex C** to the call for proposals, concerning the subject/type of grant for which you are competing **c) interview**	
Evaluation criteria	**a) evaluation of qualifications:** up to a maximum of **25 points** minimum score to access the interview **12 points** **b) interview:** up to a maximum of **75 points** the interview is passed for a score not less than **48 points** **Minimum total score: 60 out of 100**	
Assessable qualifications	**Graduation Thesis** (The candidate must attach a summary of the thesis, in Italian or English, of max 16.000 characters)	Up to **5** points
	Degree mark (For candidates who have not yet obtained the degree, the weighted average of the marks obtained in all the exams of the degree program, taken on the date of submission of the application for admission, will be evaluated)	Up to **16** points
	Scientific publications (Articles in national and international scientific journals, proceedings of scientific conferences, books or book chapters)	Up to **2** points
	Other titles (University degrees or Master Specialization, Research Grants, Scholarships, Erasmus scholarships and periods of activity abroad, …)	Up to **2** points
Interview program	The interview, which can be held in Italian or English, will focus on the discussion of the submitted research project and is aimed at ascertaining the candidate's scientific interests and aptitude for research. During the interview, the knowledge of the Italian language will be ascertained for foreign candidates.	
Foreign language	**English** (knowledge of a foreign language will be assessed during the interview)	
Schedule of the admission tests	**Evaluation of qualifications: results will be available from <u>October 28, 2025</u>** on the website http://portale.unibas.it/site/home/didattica/dottorati-di-ricerca.html **Day of the interview: <u>November 4, 2025 - 10:30 a.m.</u>** Room G2, II piano – Department of Engineering – Macchia Romana Campus, 85100 Potenza	