PhD Programme Table - 39th cycle
Call for Applications for further PhD positions
funded by Next Generation EU - NRRP ex M.D. 117/2023 and 118/2023
and from other sources - PhD Programmes (39th cycle)
A.Y. 2023/2024

Finanziato dall'Unione europea NextGenerationEU | Ministero dell'Università e della Ricerca | Italiadomani PIANO NAZIONALE DI RIPRESA E RESILIENZA | ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

Section "Available Positions and Scholarships" integrated on 20/07/2023

Section "Available Positions and Scholarships" integrated on 02/08/2023

Section "Available Positions and Scholarships" modified on 21/08/2023

Section "Available Positions and Scholarships" modified on 30/08/2023

PROGRAMME'S NAME	MECHANICS AND ADVANCED ENGINEERING SCIENCES (DIMSAI)
DURATION	3 years
PROGRAMME START DATE	01/11/2023 (DD/MM/YYYY)
LANGUAGES	Italian, English
COORDINATOR	Prof. Lorenzo Donati (l.donati@unibo.it)
CURRICULA	1. Engineering and Industrial Design, Machine Construction, Metallurgy, and Manufacturing Technologies 2. Fluid Machinery, Energy Systems, Mechanics of Machines, and Industrial Mechanical Plants 3. Thermal Physics, HVAC Systems, Acoustics, Nuclear Technologies and Industrial Applications of Plasmas
PhD POSITIONS	24
ADMISSION PROCEDURE	Qualifications and research proposal evaluation Oral examination

Available Positions and Scholarships

Pos. n.	Financial Support	Description	Curriculum	Positions linked to a specific research topic
1	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by CEE – Consorzio Esperienza Energia	3	Demand-side Response – Active participation of demand in the energy market; in summary, the research will have to deal with identifying ways to allow industrial demand in aggregate form, in relation to the development of renewable energy communities, the development of mobility and renewables, to provide flexible services to the national electricity grid

2	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by Montenegro Srl	2	Analysis and Implementation of a "Control Tower" tracking system
3	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by Bonfiglioli SpA	2	Hydraulic motors for innovative applications on off-road vehicles
4	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by Bonfiglioli SpA	2	Analysis of the thermomechanical completion of a 2-speed planetary gearbox managed by a clutch, for a 4-wheel drive earthmoving vehicle
5	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by Bonfiglioli SpA	2	Study for a robotic gearbox assembly cell
6	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by Bonfiglioli SpA	1	Research and development of a complete IoT platform, from the Smart Sensor to the Cloud, which allows the monitoring, diagnostics and predictive maintenance of mechanical systems through AI, Digital Twin and Augmented Reality
~~**7**~~	~~***PhD Scholarship PNRR ex M.D. 117/2023***~~	~~Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by Eascon Srl~~	~~1~~	~~Smart Manual Project: BI-REX project with the collaboration of Eascon, UniBo, Vection Italy, Expert AI~~
~~**8**~~ **7**	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by IMA SPA	2	Multi-robot cooperative manipulation in dynamic applications
~~**9**~~ **8**	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023)	1	Correlation between process, microstructure and properties of high strength-to-weight ratio foundry aluminum alloys for automotive applications

		and by Automobili Lamborghini Spa		
~~10~~ 9	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by G.D. SpA	1	Recycling and recovery of battery cell waste or end-of-life products: 1) production of new electrodes from waste or end-of-life products; 2) development of new products based on "design for recyclability" techniques; 3) development of new machines for the recovery of waste or end-of-life products
~~11~~ 10	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by G.D. SpA	1	Multiphysics numerical simulation of battery cells: 1) numerical simulation during production processes (winding, filling); 2) numerical simulation of electro-thermo-mechanical processes in the different phases of operation (charge and discharge of electricity); 3) validation of numerical models with experimental data
~~12~~ 11	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by G.D. SpA	1	Multiphysics numerical simulation of battery cells: 1) numerical simulation during production processes (winding, filling); 2) numerical simulation of electro-thermo-mechanical processes in the different phases of operation (charge and discharge of electricity); 3) validation of numerical models with experimental data
~~13~~ 12	***PhD Scholarship***	Funded by ENEA Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Sostenibile with funds made available by the project H202, Programme agreement MiTE – ENEA for the regulation of the research activities in the framework of the National Resilience and Recovery Plan (NRRP) – Mission 2 – Component 2 – Investment 3.5, funded by the EU – Next Generation EU, Research Operational Plan "Ricerca e sviluppo di tecnologie per la filiera dell'idrogeno" - CUP I83C22001170006	2	Mechanical and fluid dynamics design of systems for testing alkaline electrolytic cells stacks and components
~~14~~ 13	***PhD Scholarship***	Funded by INAIL Istituto Nazionale Assicurazione Infortuni sul Lavoro	2	Development and experimental validation of solutions to increase the safety of mobile robotic systems that physically interact with human operators

~~15~~ 14	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by METALCASTELLO S.p.A.	2	Study of new systems (technologies, materials, tools and processing parameters) for the finishing and superfinishing of gear wheels and planetary crowns in the field of power transmissions also with the EV (Electric Vehicle) type
~~16~~ 15	***PhD Scholarship***	Funded by the Department of Industrial Engineering	2	Innovative mechatronic solutions for robotics and automatic machines
~~17~~ 16	***PhD Scholarship***	Funded by ENEA Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Sostenibile	3	Analysis of severe accidents in PWR fission reactors of II e III generation by using advanced methodologies
~~18~~ 17	***PhD Scholarship***	Funded by ENEA Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Sostenibile	3	Implementation of the OFFBEAT nuclear fuel code on HPC clusters for artificial intelligence applications
~~19~~ 18	***PhD Scholarship***	Funded by ENEA Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Sostenibile	3	Analysis of severe accidents in LW-SMR
~~20~~ 19	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by Big Data Innovation & Research Excellence	3	AP-PECVD processes for bonding and plasma jet printing of electronic devices
~~21~~ 20	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by Newcleo S.r.l.	3	Assessment of a new model for the investigation of a hypothetical SGTR accident in LFR reactors
~~22~~ 21	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by Newcleo S.r.l.	3	Calibration and validation of a code for the description of the thermo-mechanical behaviour of nuclear fuel rods
~~23~~ 22	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by CIRA SCpA - Centro Italiano Ricerche Aerospaziali	2	Development of a numerical suite for cathodless plasma thrusters
~~24~~ 23	***PhD Scholarship PNRR ex M.D. 117/2023***	Funded by the EU - NextGenerationEU with funds made available by the National	1	Development of hybrid joining technology between metallic and composite materials for the

		Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment 3.3 (M.D. 117/2023) and by BI-REX Big Data Innovation & Research Excellence		manufacture of ultra-lightweight structural components using three-dimensional interfaces
~~25~~ **24**	***Research Grant***	Provided by the Department of Industrial Engineering. The research grant will have a duration of 12 months, renewable up to 36 months, and gross percipient amount of €20,266.98 per year	~~2~~ 1	Analysis and feasibility study of hybrid metal/metal and metal/composite joints by shaping the surfaces obtained through rolling process

The number of positions and scholarships may be incremented in case additional funding becomes available, notwithstanding the terms of the application process as detailed in Art. 3 of the Call for Applications. Any amendment, update or integration of the Programme Table will be published, even after the Call for Applications has expired. Any further PhD positions shall be integrated in the PhD Programme Table within ten days before the oral examination.

All PhD positions winners shall fulfill the learning and research obligations decided by the Academic Board and the obligations foreseen in the relevant regulations, funding schemes and eventual agreements, and in the Call for Applications. Moreover, applicants awarded with PhD scholarships funded by Next Generation EU shall fulfill specific obligations foreseen in the relevant funding scheme, in the relevant regulations and in the Call for Applications.

Admission Exams

	DATE AND TIME	**RESULTS**
Qualifications and research proposal evaluation	Applicants' participation is not required	Available from **01/09/2023****
Oral examination	**Date**: starting from **05/09/2023 – 9.00 a.m. CEST*** **Place**: In presence, Scuola di Ingegneria, Viale Risorgimento 2, Bologna. Remotely, using Microsoft Teams	Available from **12/09/2023****

* In case that the oral examination cannot be completed in one day due to the large number of applicants, the oral examination detailed schedule shall be made available on the webpage Studenti Online together with the results of the qualifications and research proposal evaluation. **During the oral examination, applicants may express their interest in one or more positions linked to specific research topics.**

** The **results of the admission exams** will be available on the webpage Studenti Online (select "summary of the requests in progress" > "see detail" and open the .pdf file at the bottom of the page). **No personal written communication will be sent to applicants concerning the examinations results**.

Required and Supporting Documents to be attached to the application

All the documents listed below **shall be drawn up in English or Italian**. In case of documents originally issued in any other language (e.g. identity document, qualifications), an official translation is required.
Only qualifications obtained **during the last 5 calendar years** shall be taken into consideration, except for the University Degree. The Admission Board will assess the relevance of the supporting documents to the PhD Programme.

REQUIRED DOCUMENTS	
Identity document	Valid identity document with photo (i.e. identity card, passport)
Curriculum Vitae	No specific CV format is required
Degrees	Documents attesting the awarding of the first and second cycle degrees, the exams taken and the marks obtained (see Art. 3 of the Call for Applications)
Research proposal	Multi-annual research proposal, **with special emphasis on the activities to be completed during the first-year course**. The proposal must meet the following requirements:

	- **it cannot exceed 20,000 characters**, including spaces and formula possibly used. This figure does not include: the title of proposal, the outline, references and images (such as graphs, diagrams, tables, etc. - if present); - **it must include**: the state of the art; description of the proposal; expected results; references.
SUPPORTING DOCUMENTS	
Thesis abstract	Abstract of the **second cycle degree thesis.** Graduands applicants may submit the draft of the thesis. Abstracts cannot exceed 5,000 characters, including spaces and formula possibly used. The above figure does not include: the title of the thesis, the outline, references, and images such as graphs, diagrams, tables etc.
Publications	Lists of publications (i.e. monographs, articles on scientific journals) and minor publications (conference papers, etc.)
Other documents	- Research activity of any kind - whether basic, applied, translational, etc. - carried out in any capacity, including when covered by research grants, and as a staff member of research projects - Documents attesting the applicant's foreign languages proficiency - Periods of study abroad, completed by applicants outside their countries of origin (e.g. Erasmus programme or other similar mobility programmes) - Other qualifications attesting the suitability of the applicants (scholarships, prizes, vocational programmes, etc.)

Evaluation criteria*

Scores will be expressed in points out of 100, as follows.

1. Qualifications and research proposal evaluation

Minimum score for admission to the oral examination: 30 points, Maximum score: 50 points

Qualifications evaluation	First (Bachelor's) and second cycle (Master's) degrees final marks. Graduands shall be evaluated according to the Weighted Average Mark (WAM)	20 points max
	Publications and other qualifications attesting the applicant's training and skills	5 points max
Research proposal evaluation	Scientific value and ground-breaking nature of the proposal	15 points max
	Structure of the proposal	5 points max
	Proposal feasibility	5 points max

2. Oral examination

Minimum score for eligibility: 30 points, Maximum score 50 points

English language proficiency	5 points max
Applicant's suitability for academic research and knowledge of the topics connected to the research proposal	20 points max
General knowledge of the PhD programme's main research topics and of the research topics linked to the available PhD positions	25 points max

Oral examination aims to assess the suitability of the applicant for scientific research as well as the general knowledge of the PhD programme's main research topics and of the research topics linked to the available PhD positions. The applicant will be required to express interest for one or more topic-specific PhD positions: during the oral examination the knowledge of the chosen topic/s shall be assessed.

During the oral examination, the applicant's English language proficiency shall be assessed.

The oral examination is carried out in Italian or in English.

* Possible further evaluation criteria will be available on the University website, selecting the relevant PhD Programme > "More information".