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INDUSTRIAL ENGINEERING	
CYCLE	**XXXVIII**
COORDINATOR	Prof. Gianni ROYER CARFAGNI email: gianni.royer@unipr.it Department of Engineering and Architecture
DURATION	3 years
STARTING DATE OF THE PHD PROGRAM	01/11/2022

RESEARCH TOPICS (The candidate **MUST mandatorily** indicate one research topic in the form ANNEX A and submit a RESEARCH PROJECT in the relevant field)

- Theoretical and applied mechanics, mechanics of materials and structures, material technology, machine design, measurements and diagnostics;
- Economic, organizational, managerial, logistics, plants and legal aspects in the field of engineering;
- Energy systems, thermo-fluid dynamics, fluid machinery, applied physics.

TRAINING OBJECTIVES

The Industrial Engineering PhD program aims at giving to the participants a deep knowledge in the main topics relevant to industrial engineering. The PhD course presents numerical, analytical and experimental techniques, in order to face any technical or scientific problem of the industrial engineering, with managerial skills, to provide autonomy in work and readiness of inclusion in a collaborative environment with other researchers and technicians. The internationalization phase, envisaged in the three-year curriculum, allows to forge links with other foreign realities by providing to the graduate student an additional tool to get into a scientific context, not just limited by national borders.

ADMISSION REQUIREMENTS	Regardless of age and citizenship, applicants holding at least one of the following academic qualifications can apply for admission: – Laurea specialistica or Laurea magistrale (second cycle master's degree) – Laurea Vecchio Ordinamento (degree obtained under the previous Italian regulations); – Second cycle Master's degree obtained abroad, equivalent to the above mentioned Italian degrees and recognized as suitable for the admission to doctoral program Undergraduates can also apply for admission to the selection, with the obligation to obtain the degree within the deadline set for enrollment, that is **by 24.10.2022**

POSITIONS PUT OUT TO COMPETITION* **(Modified by Rector Decree n. 1391 of 01.09.2022)**	**22**	With Scholarship	**19**
		Reserved to holders of Research Grant	**2**
		Reserved for employees of companies or public institutes and research centers engaged in highly qualified activities	**1**

Position with Scholarship

N°	*Funding entity*	*Research Topic, if any*
3	Scholarship funded by University of Parma (Ministerial funds)	---
1	Scholarship funded by University of Parma (University funds)	---
1	Scholarship co-funded by Fondazione Cariparma	---

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Position with Scholarship LINKED TO SPECIFIC TOPICS (art. 11 of the Competition notice) **(Modified by Rector Decree n. 1391 of 01.09.2022)**		
During the Oral Exam, applicants may express and/or confirm their interest of being assigned a scholarship linked to a specific research topic. The Examination Board will evaluate their eligibility based on specific competences, experience and specific aptitudes of the applicants.		
N°	***Funding entity***	***BOUND RESEARCH TOPIC***
1	Scholarship partly financed with UNIVERSITY funds and co-financed by the Department of Engineering and Architecture	• Optimisation of logistics and supply chain processes using simulation models and advanced performance evaluation systems (such as lean, agile, resilient & green - LARG)
1	Scholarship financed with funds under the PNRR– Mission 4 component 1 **(Ministerial Decree 351/2022 art. 6** "Digital and environmental transitions") Finanziato dall'Unione europea NextGenerationEU	• The enhancement of by-products from matrices of plant origin in the food industry: qualification, food safety legislation and its applicability, patentability profiles
1	Scholarship co-financed with funds under the PNRR - Mission 4 component 2 (**Ministerial Decree 352/2022**) and co-financed by the Company Maselli Misure S.p.A. Finanziato dall'Unione europea NextGenerationEU	• Lean production methodologies for improving production efficiency, liquidity and responsiveness to market demands
1	Scholarship co-financed with funds under the PNRR - Mission 4 component 2 (**Ministerial Decree 352/2022**) and co-financed by the Company KOSME S.r.l. Finanziato dall'Unione europea NextGenerationEU	• Re-design of "end-of-line packaging machinery" with the implementation of Structural Optimization, Design for Manufacturing and Design for Assembly concepts, in order to enhance the machine sustainability and competitiveness
1	Scholarship co-financed with funds under the PNRR - Mission 4 component 2 (**Ministerial Decree 352/2022**) and co-financed by the Company PLM4U S.r.l. Finanziato dall'Unione europea NextGenerationEU	• Life Cycle Engineering and product design for Disassembly
1	Scholarship co-financed with funds under the PNRR - Mission 4 component 2 (**Ministerial Decree 352/2022**) and co-financed by the Company FMB-Engine S.r.l. Finanziato dall'Unione europea NextGenerationEU	• Advanced simulation or artificial intelligence techniques for both design and management of industrial plants and their major components
1	Scholarship co-financed with funds under the PNRR - Mission 4 component 2 (**Ministerial Decree 352/2022**) and co-financed by the Company DexMat Inc. Finanziato dall'Unione europea NextGenerationEU	• DexMat Inc., Located in Houston, TX, USA, manufactures high performance products made from Carbon Nanotubes (CNTs). The supported student shall develop theoretical and experimental activities on solution spun CNT fibers with different nano-structural compositions, organized in strands, ropes and cables, for which the

		capacity in terms of strength, stiffness, robustness and resilience will be verified and compared with the theoretical predictions.
1	Scholarship co-financed with funds under the PNRR - Mission 4 component 2 (**Ministerial Decree 352/2022**) and co-financed by the Company Kuraray Europe GmbH Finanziato dall'Unione europea NextGenerationEU	• Kuraray Europe GMbH, located in Germany, is a wholly owned subsidiary company of the Japanese Kuraray group, the leading supplier of specialized products such as polymeric foils for laminated glass. The supported student shall develop advanced models, corroborated by experimental activities, for the viscoelastic characterization of polymeric films, to be applied in structural models for beams, plates and shells made of laminated glass.
1	Scholarship co-financed with funds under the PNRR - Mission 4 component 2 (**Ministerial Decree 352/2022**) and co-financed by the Company RE:LAB S.r.l. Finanziato dall'Unione europea NextGenerationEU	• Analysis and synthesis of the sound produced by automotive vehicles with electric motors, through numerical models and digital signal processing
1	Scholarship co-financed with funds under the PNRR - Mission 4 component 2 (**Ministerial Decree 352/2022**) and co-financed by the Company Laboratorio Geotecnologico Emiliano S.r.l. Finanziato dall'Unione europea NextGenerationEU	• Analysis of structural dynamics via advanced monitoring systems and numerical simulation
1	Scholarship financed under the PNRR – Mission 4 component 2 – Investment 1.4 National Center for sustainable mobility Finanziato dall'Unione europea NextGenerationEU	• Rail joints and related monitoring and diagnostic systems for predictive track maintenance.
1	Scholarship financed under the PNRR – Mission 4 component 2 – Investment 1.4 National Center for Agricultural Technologies AGRITECH Finanziato dall'Unione europea NextGenerationEU	• Design, implementation and management of the "living lab"
1	Scholarship financed under the PNRR – Mission 4 component 2 – Investment 1.5 Ecosystem for sustainable Transition in Emilia-Romagna Finanziato dall'Unione europea NextGenerationEU	• Design of supply chains through data-driven systemic design approach and performance evaluation in prototyping smart design solutions for circular economy
1	Scholarship financed under the PNRR – Mission 4 component 2 – Investment 1.5 Ecosystem for sustainable Transition in Emilia-Romagna Finanziato dall'Unione europea NextGenerationEU	• Advanced measurements and analysis techniques for condition monitoring of complex systems
Position reserved to HOLDERS OF RESEARCH GRANT		
N°	***Subject area of the research***	

1	ING-IND/10 – Thermal engineering and industrial energy systems • Study, development and characterisation of high-performance heat exchange devices with a view to energy saving
1	ING-IND/17 – Industrial Mechanical Systems Engineering • Environmental Impact Analysis of industrial systems using LCA methodology, with a main focus on the agri-food and food packaging sector, in order to find solutions with a low global impact in line with the principles and timelines dictated by the European Union
Position reserved for EMPLOYEES of companies or public institutes and research centers engaged in highly qualified activities	
N°	***Company/Institution***
1	Reserved to employees of SUPSI – Scuola Universitaria della Svizzera Italiana

ADMISSION PROCEDURES	**Assessment of QUALIFICATIONS:** up to 70 points (a minimum score of 40 points shall be required to be admitted to the Oral Exam) **ORAL EXAM:** up to 50 points **Minimum score for ELIGIBILITY**: 70/120
Foreign Language	Lingua di cui verrà accertata la conoscenza in sede di Prova Orale: **INGLESE**. La verifica della conoscenza di tale lingua avverrà in forma scritta/orale e consisterà nella lettura e traduzione di un testo scientifico.
CANDIDATES ADMITTED TO THE ORAL TEST CAN TAKE THE EXAM IN PRESENCE OR REMOTELY IN AUDIO AND VIDEO TELECONFERENCE (The Oral Exam takes place in presence. Candidates who intend to take the Oral Exam remotely must submit **a motivated REQUEST**, to this purpose, as per the model attached to the competition notice)	
THE INTERVIEW MAY BE HELD ALSO IN ENGLISH	
LIST OF QUALIFICATIONS TO BE SUBMITTED AND THEIR ASSESSMENT	
MANDATORY DOCUMENTS TO BE ATTACHED TO THE ON-LINE APPLICATION	
ANNEX A	(art. 5 of the Competition notice)
Identification Document	Scanned Copy of a valid identity document with photo (i.e. identity card, passport)
Curriculum Vitae et studiorum	No specific CV format is required (see art. 4 of the Competition notice)
Abstract of degree thesis	Abstract of the second cycle master's degree thesis. Undergraduate applicants must submit the draft of the thesis approved by their supervisor (abstract/draft of the thesis: 10.000 characters including spaces)
Qualifications	**Certificates and academic transcript of records for both Bachelor' and Master' degrees** containing the following details for each degree held: (art. 4 of the Competition notice): University that granted the degree - Type of degree (first cycle/second cycle/single cycle) Name of the degree program - Date of graduation - Final mark - List of exams and corresponding scores (academic transcript of records) - Translation into Italian or English (only for degrees issued in languages other than Italian or English).

Research Project	Written in Italian or in English, according to the format attached to the competition notice, it will have to focus on an original research topic (**unpublished, developed personally by the candidate. It should be noted that the Examination Board can use of IT tools useful for verifying the originality of the submitted Project**). To identify the topic of the aforementioned project, the candidate may contact one of the Members of the Academic Board (available at: https://dia.unipr.it/it/node/2834). It does not represent a constraint with respect to the following choice of the doctoral thesis, which will be assigned by the Academic Board.
FURTHER QUALIFICATIONS THAT MAY BE ATTACHED TO THE APPLICATION, IF IN POSSESSION OF THE APPLICANT (only qualifications attested by a document drawn up in Italian or in English)	
Statement of Research interest	Short text – maximum 1 page – in Italian or in English, aimed at explaining the candidate's reasons to attend the PhD program and at describing her/his specific research interests
Scientific Publications	Articles on national and international journals, contributions presented at conferences or symposia, book chapters. It is necessary to attach a copy to online application
Reference Letters	A maximum of 2 written by professors or researchers at the University of origin of the candidate or from other universities or from experts in the research areas working in public or private research facilities (to be attached to the online application)
Other Academic qualifications	First or second level Master's degree obtained in Italy and/or specialization degree in subjects consistent with the research topics of this PhD program
Other experiences (training, work, research, teaching, etc.)	– Research activity (basic, applied, translational, etc.) carried out in any capacity, including when covedered by research grant, and as a staff member of research units – Working activity – Professional and/or training internship – Language proficiency certificates – Periods of study abroad, outside the country of origin (e.g. Erasmus programme or other similar mobility programmes) – Other qualifications attesting the suitability of the applicants (scholarships, awards, etc.)

EVALUATION CRITERIA

QUALIFICATION	EVALUTATION CRITERIA	POINTS
Curriculum Vitae et studiorum	Including academic career and postgraduate experience, accompanied by a statutory declaration in lieu of the certification of the exams passed with the relevant marks, as well as the final graduation mark, both of the bachelor's and master's degrees.	**Up to 15 points**
Graduation mark	Score related to the final mark: - 110 with honours (magna cum laude): 10 points; - 110: 8 points; - From 105 to 109: up to 6 points; - From 100 to 104: up to 3 points; - From 66 to 99: 0 points - The scores will be proportionally renormalized in case of equivalent evaluations	**Up to 10 points**
Average of the exam marks (if the candidate will attain the degree no later than 24 October 2022)	Score related to the average of the exam marks: - 30/30: 10 points; - From 28/30 to 29/30: up to 5 points; - From 26/30 to 27/30: up to 3 points; - From 18/30 to 25/30: 0 points; The scores will be proportionally renormalized in case of equivalent evaluations	**Up to 10 points**

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Graduation thesis	Consistency of the Master's Degree thesis with the doctoral program research topics	**Up to 10 points**
Research Project	Consistency of the Research Project with the doctoral program research topics	**Up to 15 points**
Statement of Research Interest	Evaluation of the candidate's motivations to attend the doctoral course and congruity of the research interests with the research topics of the doctoral course.	**Up to 5 points**
Scientific publications	Articles on national and international journals, contributions presented at conferences or symposia, book chapters. It is necessary to attach a copy to online application	**Up to 5 points**
Reference Letters	a maximum of 2 written by professors or researchers at the University of origin of the candidate or from other universities or from experts in the research areas working in public or private research facilities	**Up to 5 points**
Other Academic qualifications	First or second level Master's degree obtained in Italy and/or specialization degree in subjects consistent with the research topics of this PhD program	**Up to 2 points**
Other experiences	– Research activity (basic, applied, translational, etc.) carried out in any capacity, including when covedere by research grant, and as a staff member of research units – Working activity – Professional and/or training internship – Language proficiency cartificates – Periods of study abroad, outside th country of origin (e.g. Erasmus programme or other similar mobility programmes) – Other qualifications attesting the suitability of the applicants (scholarships, awards, etc.)	**Up to 3 points**
ORAL EXAM	**EVALUATION CRITERIA**	**POINTS**
The ORAL EXAM includes the presentation of the research project and is intend to assess the suitability of the applicant to pursue scientific research as well as the general knowledge of issues connected to the PhD course	○ research project presentation ○ general knowledge of issues connected to the PhD course ○ knowledge of foreign languages	**Up to 50 points**

SCHEDULE OF THE ADMISSION EXAMS		
ORAL EXAM	**DATE**	13 September 2022 (with possible extension in the following days)
	TIME	09:00 AM (Italian Time)
	PLACE	Meeting Room – Building 10 Department of Engineering and Architecture Parco Area delle Scienze, 181/A - Campus 43124 PARMA - ITALY
OTHER INFORMATION		For foreign candidates, the admission examinations may be held in English at the candidate's choice.